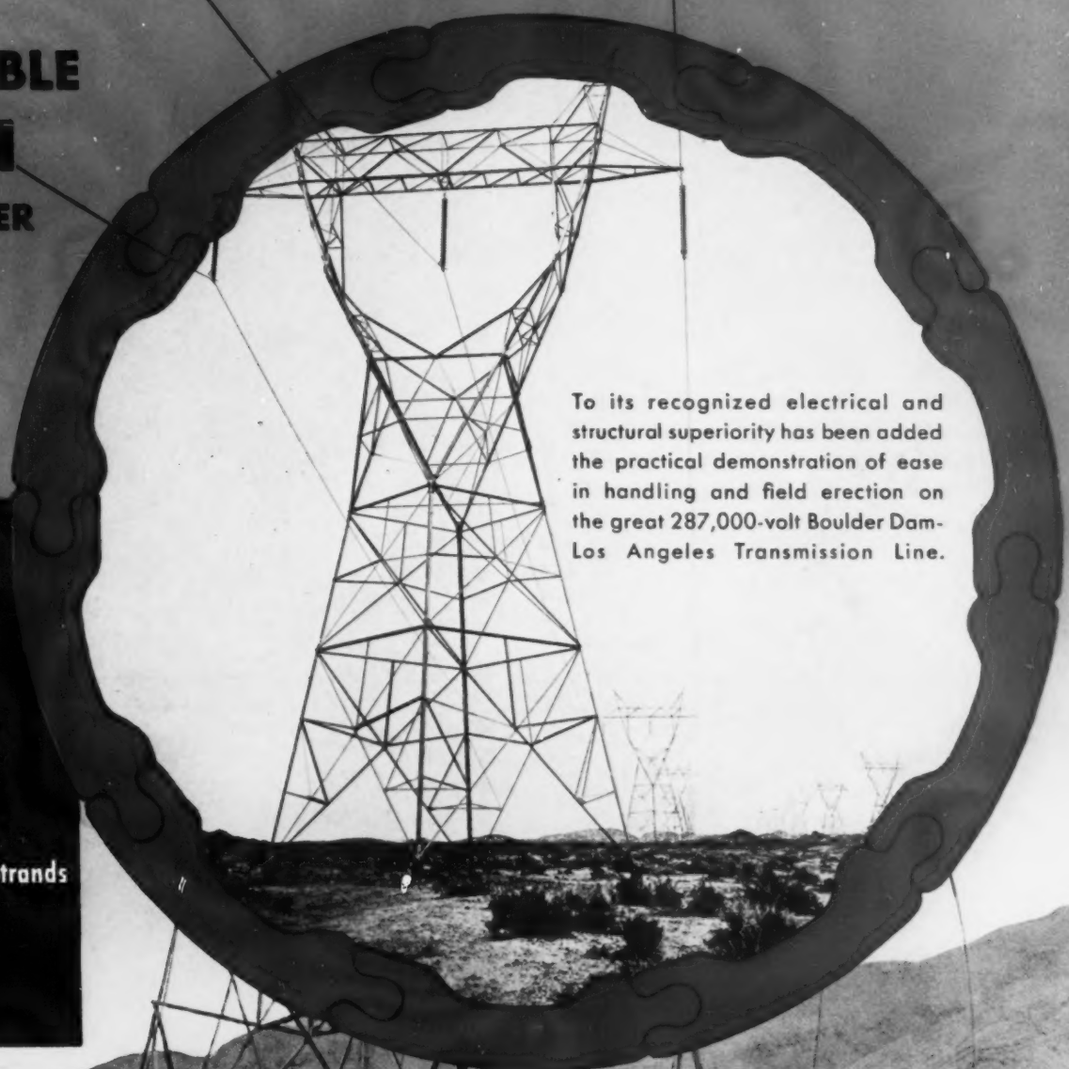
ELECTRICAL WEST

AUGUST 1935

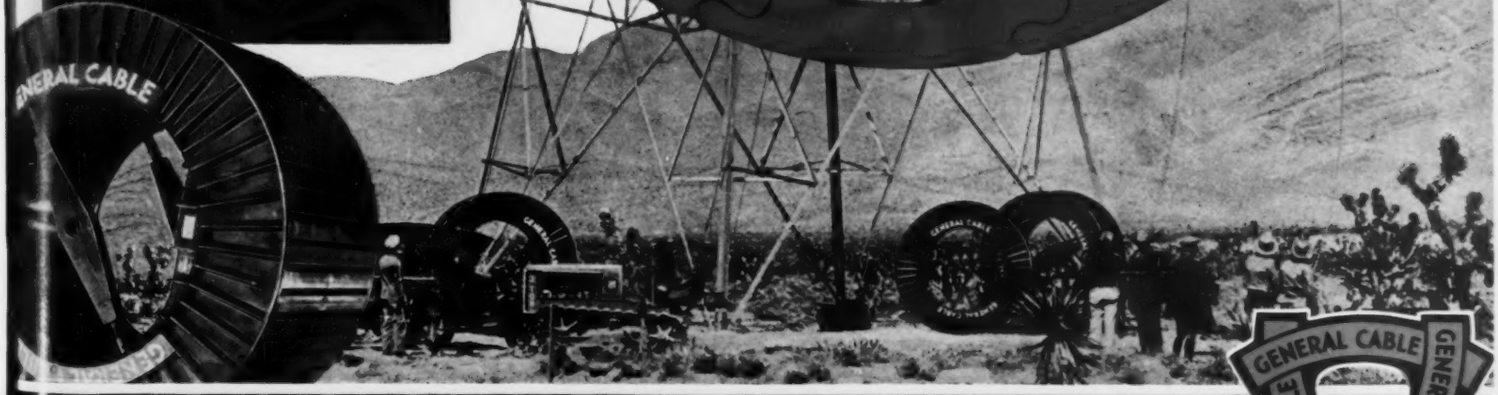
GENERAL CABLE
TYPE HH
HOLLOW COPPER CONDUCTOR

For High Voltage Power Transmission

- Ideal Dimensions and Surface Configuration
- Minimum Corona Loss
- All Copper Conductor
- Maximum Weight Saving
- Flexibility
- Inherently Non-Vibrating
- Non-Fraying Interlocked Strands
- Simplicity of Fittings
- Economical Erection



To its recognized electrical and structural superiority has been added the practical demonstration of ease in handling and field erection on the great 287,000-volt Boulder Dam-Los Angeles Transmission Line.



GENERAL CABLE CORPORATION

LOS ANGELES • SAN FRANCISCO • SEATTLE

You're the Base

OF THIS TRIANGLE

Its altitude is half a million meters on Edison lines alone. It is being constantly increased.

Its hypotenuse is an almost unlimited capacity to generate and transmit power on the part of the Edison Company.

Its base is you dealers, manufacturers and contractors and the equipment you handle. Without you, no triangle. As you lengthen the base, the figure gets bigger. All three sides grow. The area of profits enlarges and everybody benefits.

Get the right angle. Project yourself. Increase the figure.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

Edison

8-35

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ELECTRICAL WEST

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power and Gas," and the Journal of Electricity."

ESTABLISHED 1887

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Contents for August 1935

Volume 75 Number 2

Spectacular Lighting Feature of Fair 19

Bill Jones Speaks About Fishing 20

Business Development Papers 22

Business Building Brainstorms 29

Cooperation on Parade 31

Electra's Husband on "This Is the Abundant Life" 35

Operating-Economics Problem Papers 36

Realm of Science 46

Trade Associations 47

Editorials 50

News of Note 52

Where To Buy It in the West 61

▼

• In this issue the editors introduce a new department, "Trade Associations," designed to help the industry, particularly the contractors, coordinate their activities without the help of NRA. In this issue an experienced attorney suggests the machinery by which trade associations might retain the benefits of cooperation.

• Free wiring sold over 2,000 electric ranges in 90 days in Portland, Oregon. Read what dealers, contractors and other members of the industry had to say about the campaign in "Cooperation on Parade."

• Third prize winners in P. C. E. A.'s prize contest are published in this issue, the last of the series. Needless to say, these papers all contain ideas well worth studying by every man and woman in the industry.

• Load building being the order of the day, Electrical West has planned two fine feature issues for September and October. September will feature Better Light-Better Sight selling material. A number of Western lighting specialists will contribute from their fund of knowledge and experience. Now is the time to take advantage of the seasonal upward trend in lighting sales. In its October issue, the editors promise an unusual feature which should help every dealer, wholesaler and power company salesman—a selling manual to be published as an insert in that issue. A fine staff of merchandising experts is preparing basic selling information on electrical appliances of every type. This data will be a distinct aid not only in planning the fall and Christmas merchandising campaigns but also as a year around guide to profitable merchandising methods.

Sales Talks that SOLD Appliances

CASE HISTORY NO. 8

EVERY GOOD SALESMAN is a crusader. One reason why Bill Smith is a successful field salesman is his firm conviction that he is really performing a service by persuading people to enjoy the advantages offered by electrical home servants. His job is to explain to people the convenience, economy, cleanliness, and healthfulness of using electricity for domestic chores. People that know and appreciate what electricity can do to minimize their work and increase their comfort don't have to be sold—they buy electrical appliances.

This conviction, based on his own experience gives him the confidence in himself and his sales message that makes "doorbell-pushing" a profitable method of beating the summer slump. Today he is calling on a former customer of his to try and sell a water heater on the theory that in hot weather, hot water is a greater necessity and less likely to be available in the average home because the furnace is on a vacation.

BILL *(to Mrs. Tate who answered the door)*: "Good morning, Mrs. Tate. I called to see how you are enjoying your electric range?"

MRS. TATE: *(cordially)* "Come in, Mr. Smith, and sit down. Yes, I am very much pleased with electric cookery. This warm weather we're having certainly makes me appreciate the automatic features and it keeps the kitchen lots cooler than my old stove."

BILL: "I'm mighty glad to hear that and speaking of warm weather reminds me that I have some information here that may interest you. Most people have difficulty in getting enough hot water during the summer when the need for it is greatest for all the baths, showers, and clean sport clothes required by the family. Did you know, Mrs. Tate, that electricity could provide you with instant abundant hot water all the time automatically, silently and economically?"

MRS. TATE: "Why, I hadn't thought so much about it except that it is annoying at times during the summer to have to wait to heat water, particularly when you are in a hurry. In the winter, though, we never have to worry for we have more than we need. I guess that's because we have a furnace fire going all the time."

BILL: "That's generally the way with non-automatic water heating systems, either too much or too little water. That's why I would like to tell you how the new automatic electric water heaters can lighten your work, save you money at the same time, give you instant hot water day or night."

MRS. TATE: "Well it would be nice to have all the hot water we could use during the summer but we wouldn't need the heater in the winter. I know Mr. Tate wouldn't want to put money into an appliance that was used only a few months of the year."

BILL: "You are quite right in that, Mrs. Tate, but an electric water heater is used the year around. For a very good reason, too. Most people think that the furnace fire both heats the house and the water without extra fuel but really heat that goes into the house cannot also be used to heat the water too. It takes extra fuel to heat the water. You will be surprised to know that the heating engineers estimate that one-fifth of the fuel used during the winter goes to heat the water in the coils of the average furnace. By heating your water separately in an automatic electric heater you immediately cut 20 per cent off your house heating cost. That amounts to considerable money."

MRS. TATE: "Are you sure those figures are right, Mr. Smith. It seems like a good deal of extra fuel."

BILL: "It does, doesn't it, but here is the figure in this report on the subject made by a prominent university. Heating your water with furnace coils is very wasteful. The hot water is stored in a bare, uninsulated tank which radiates much of the heat into the surrounding air. Furthermore, when the furnace fire is hot the water is heated to a point where it has to be diluted with appreciable amounts of cold water before it can be used. Losses often result from overheating of water during extreme weather. Frequently overheated water backs up through cold water lines and ruins water meters and spoils plumbing. These and other unseen

losses are eliminated by the automatic electric water heater which stores plenty of hot water for use at just the right temperature. It operates on the same principle that is used on the automatic control of your electric range, Mrs. Tate, and it's just as cool, convenient and clean."

MRS. TATE: "But isn't it pretty expensive to use electricity to keep a tank full of water hot the year round?"

BILL: "I can see where you might think so, Mrs. Tate, but it really is very inexpensive. I think this picture will show you why. *(Bill removes picture of water heater from brief case).* You see instead of a bare tank, the electric water heater is scientifically insulated with materials of the finest quality to prevent heat of the water from being dissipated into the room. Then, too, the electric elements are placed so that every bit of the heat generated by the electric current is utilized to warm the water. When the temperature reaches the right point for use, these little thermostats turn off the current completely and will not turn the heater back on until you have used some of the hot water. These little watchmen (indicating thermostats) see to it that you always have hot water without waste and they also guard against the overheating of the tank. You could go away for a month with the electric water heater on because these units always turn the heater off when the temperature rises to a suitable temperature. Once you have installed an electric water heater forget it completely because the high quality workmanship and the simple, reliable construction will give you years of wear and service without attention or adjustment. It has a handsome exterior, too, don't you think, Mrs. Tate?"

MRS. TATE: "It certainly is attractive all right. About how much would it cost?"

BILL: "It's really very inexpensive. For only a few cents a day you can buy dependable, clean, convenient year 'round hot water service. That includes the small addition it will make to your electric service bill, too. The power company makes a very low rate for water heaters of this type because they can be adjusted to use electricity when it is not needed for other purposes. May we install one tomorrow to give you the luxury of abundant hot water during the rest of the summer?"

MRS. TATE: "Well, I see where it would be very convenient but I couldn't decide without talking it over with Mr. Tate. Maybe I can get him to come down to your store and look at one tomorrow or the next day."

BILL: "That's a fine idea and I'm sure that he, too, will agree that the low cost of automatic electric hot water service makes it a real bargain in a modern home service. The thing he'll appreciate most is getting up in the morning and having hot water right at the tap for his shower and shave. To the average business man the saving of time right there is worth much more than the few dollars a month it would take to buy this water heater on our convenient budget terms. I know he would be more than pleased if you decided to install this modern, efficient and economical appliance, so why not let me select one that will meet the needs of your family and send it out? I can assure you that once you have experienced the convenience of automatic electric water heating you will never be without it again and you won't miss the small payments necessary to bring it in your home."

¶ An important point in Bill's selling is the way he shows the customer the advantages of the use of an electric water heater. He does not sell elements, metal and insulation but health, comfort, convenience etc.

MRS. TATE: "Well it isn't absolutely necessary for Mr. Tate to see the heater and if you are sure that it won't run our electric bill up too high I don't see any reason why you shouldn't do that. The electric range you sold me has proven every claim you made for it."

BILL: "I certainly appreciate the confidence you have in me, Mrs. Tate, and you can rely upon our company to stand behind every statement we make 100 per cent. Satisfied customers are the best assurance we have of building our business and I know that you'll be more than satisfied with this new electrical servant."

¶ Bill has demonstrated his ability to get the order even when the prospect has said "later." He also very cleverly capitalized upon the satisfaction his former sale has given the prospect and the confidence which his interest and honesty has engendered. Satisfied customers are his best prospects.

CALIFORNIA OREGON POWER CO. | PORTLAND GENERAL ELECTRIC CO.
MOUNTAIN STATES POWER CO. | PUGET SOUND POWER & LIGHT CO.
PACIFIC POWER & LIGHT CO. | IDAHO POWER COMPANY
NORTHWESTERN ELECTRIC CO. | WASHINGTON WATER POWER CO.
★ UTAH POWER & LIGHT COMPANY ★

Toastmaster

Here is beyond question the finest merchandise Toastmaster ever has offered the trade and public. The new Toastmaster Hospitality Tray, in three beautiful finishes, is now ready for delivery.

Brilliantly styled with matched design throughout. More cleverly complete in accessories. All glassware by Fostoria—"The Glass of Fashion." *New*—four-nested snack plates, recessed to hold cup or glass. *New* crystal two-compartment appetizer dishes. *New* cutting block for trimming toast. *New*, larger, better designed tray available in three woods. *New* folding stand for extra dealer profits.

And crowning it all the Toastmaster. 75% of all automatic toasters sold are Toastmasters, because Toastmaster alone, through its Flexible Toast-Timer, can guarantee perfect toast every time to everybody. This new Toastmaster merchandise will be widely advertised. Your customers will look for it in your store. Don't disappoint them.

Get this merchandise in stock and be ready to tie in with the greatest advertising program in Toastmaster history and with the nation-wide showing early in September.

Offers

A PROFITABLE SPECIAL DEAL

To give you an incentive to place your orders for new Toastmaster merchandise *early* we make this special offer:—

Place your order *now* for three Toastmaster units.

1 One Toastmaster Hospitality Tray Set (Walnut) with 2-slice Toastmaster (packed as set).

2 One Toastmaster Hospitality Tray Set (Mahogany) with 2-slice Toastmaster (packed as set).

3 One Toastmaster Hospitality Tray Set (Antique White) with 2-slice Toastmaster (packed as set).

Upon receipt of your order, for $1.00 additional we will deliver all the material listed below. The stand itself you can readily sell for $5.00.

HERE'S WHAT YOU GET!

Toastmaster Deal Items

1—1 Folding Stand (Antique White finish) $5.00 retail, special	$1.00*
2—1 Toastmaster Name Display (Solid Walnut)	FREE
3—1 Counter Display Card, Size 14 x 22⅛ inches	FREE
4—1 Window Trim, Size 24 x 36 inches	FREE
5—2 Pieces Imitation Toast	FREE
6—15 Booklets—"Help-Yourself Parties"	FREE
7—100 6-Page Folders	FREE
8—Envelope Stuffers (sample with Deal; order as needed)	FREE
9—Mats and Electros (cut sheet with Deal; order as needed)	FREE

*NOTE: If 6 or more Toastmaster units are ordered on the Deal, 1 stand, as specified above, is FREE.

McGRAW ELECTRIC COMPANY

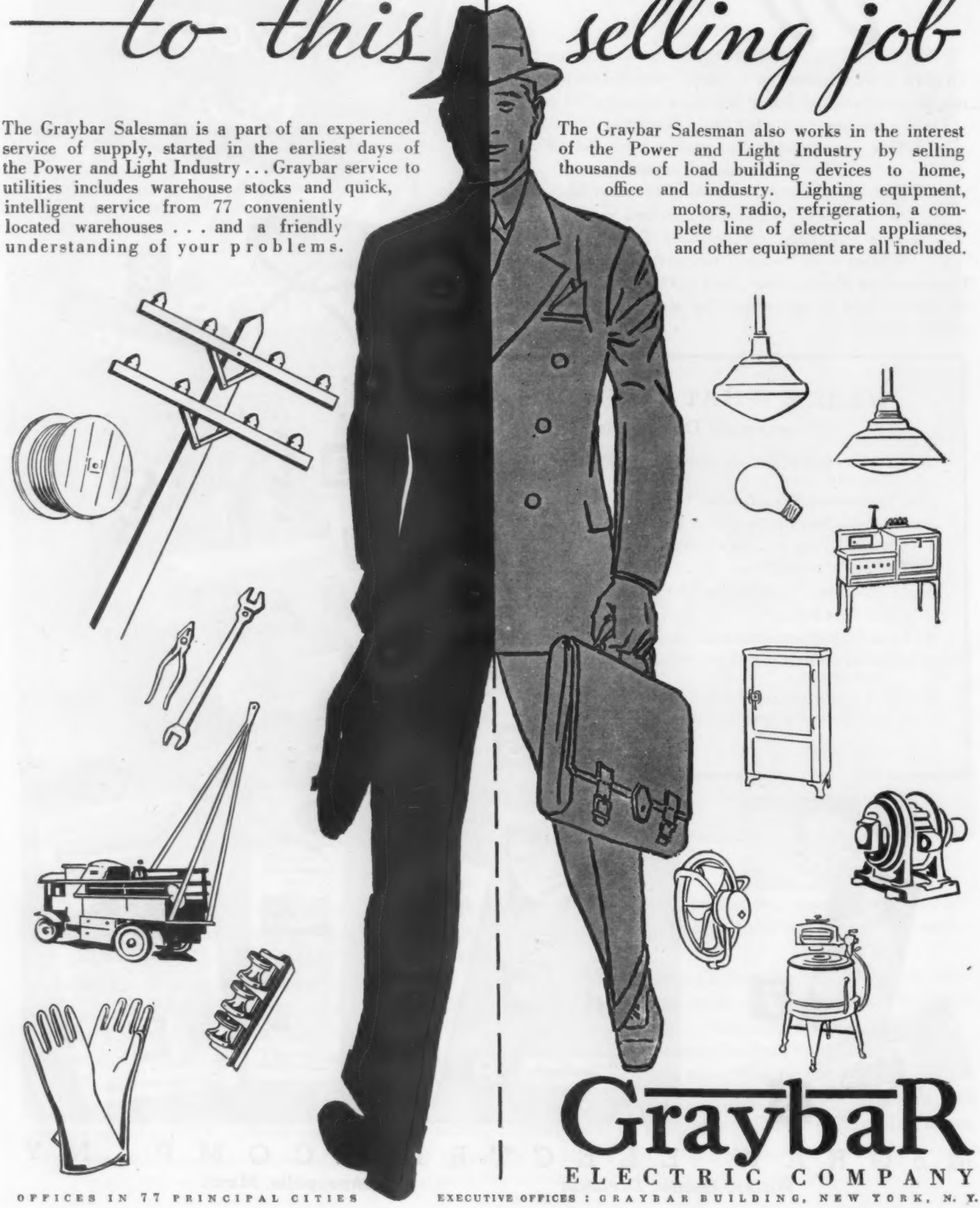
Waters-Genter Division Minneapolis, Minn.

TWO SIDES

to this selling job

The Graybar Salesman is a part of an experienced service of supply, started in the earliest days of the Power and Light Industry . . . Graybar service to utilities includes warehouse stocks and quick, intelligent service from 77 conveniently located warehouses . . . and a friendly understanding of your problems.

The Graybar Salesman also works in the interest of the Power and Light Industry by selling thousands of load building devices to home, office and industry. Lighting equipment, motors, radio, refrigeration, a complete line of electrical appliances, and other equipment are all included.

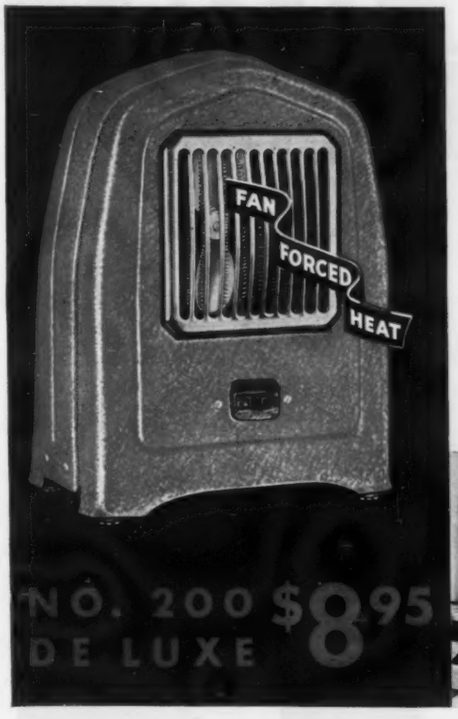


Graybar
ELECTRIC COMPANY

OFFICES IN 77 PRINCIPAL CITIES

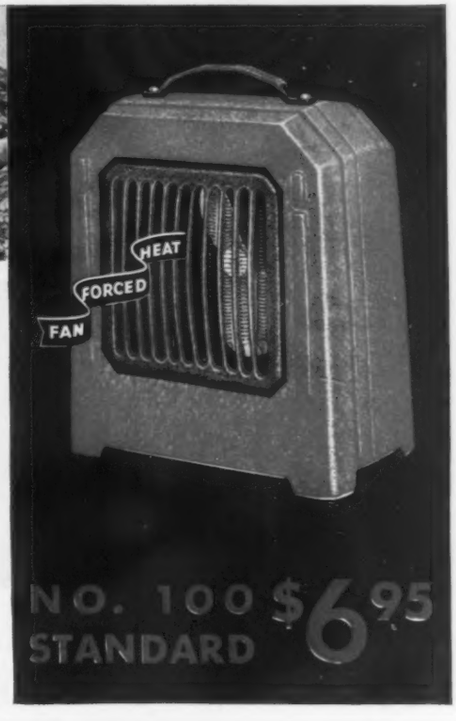
EXECUTIVE OFFICES : GRAYBAR BUILDING, NEW YORK, N. Y.

SAFE HEAT—SURE PROFITS



PROVED BY 4-YEAR SALES RECORDS

● The season of uncertain weather just ahead will make prospects for Arvin Fan-Forced Electric Heaters of all your customers. And when they see a demonstration—snap the switch, and feel the gentle breeze of circulating warmth—they're sure to buy! Arvin solves the problem of extra or temporary heat wherever 110-volt A.C. is available. For office, nursery, or bathroom, Arvin is just the thing. Get your stock of Arvin heaters right away—display them prominently. Good sellers for 4 years—they'll earn real profits for you. Call an Arvin jobber near you, or mail the coupon at the bottom of this page now.



STURDY . . . ATTRACTIVE . . . EFFICIENT

● The heavy gauge steel cabinet, finished in beautiful and permanent green morocco enamel, not only makes Arvin Heaters durable, but also gives them an appearance perfectly in keeping with the furnishings of any room.

No Radio Interference—The heating unit consists of a nichrome helical-type heating coil, through which air is driven by a small fan. The fan motor is induction type—has no brushes, springs, or commutator—and does not interfere with radio reception. It requires no attention other than a few drops of oil two or three times a year. Operates on 110-volt A.C. The heating unit and fan are fully enclosed—cannot burn children or furniture.

NOBLITT-SPARKS INDUSTRIES, *Inc., Columbus, Indiana*
Also Makers of Arvin Hot Water and Steam Car Heaters and Arvin Car Radios

Approved by leading authorities—the Good Housekeeping Institute, and the Underwriter's Laboratory.

Tested and Approved — 1926 — Good Housekeeping Institute — GOOD HOUSEKEEPING MAGAZINE

ARVIN FAN-FORCED ELECTRIC HEATERS

NOBLITT-SPARKS INDUSTRIES, Inc., Columbus, Ind.: Send us full information on Arvin Fan-Forced Electric Heaters.
Check whether you are Jobber ( ) or Dealer ( )

FIRM NAME..... ADDRESS.....

NEW HOTPOINT

This full size range with large automatic oven and super-speed broiler introduces a new era in modern range styling. Available in French gray or gleaming white porcelain with chromium trim.

THE DAWN OF A NEW ERA IN ELECTRIC RANGE STYLING

Companion to The Dawn. Cabinet type range for built-in kitchen. Available in white or cameo ivory.

DeLuxe range with five hi-speed Calrod units, two large ovens, Thrift Cooker and automatic timer clock.

HELEN HUGHES DULANY

This outstanding industrial stylist has balanced modern trends with everyday needs. She knows what women want—and the striking new line of Hotpoint ranges typify her knowledge of women's desires in household appliances today.

RANGES

Plan books for Hotpoint's Fall Sales Activities are now ready. Look over the striking new plans and advertising material.

HOTPOINT'S fourth sales campaign in the "year round" range and water heater activity gets under way with the fall "Pure Velvet" Plan.

High-spot of the program is a new line of ranges marking a distinct trend in range styling interpreted by Helen Hughes Dulany, foremost woman industrial stylist. The introduction of these new ranges is accelerated by national magazine advertising, and an entire new line-up of sales, advertising and promotional material for fall.

Released, as it is, following the most active range advertising and selling year in the industry's history, the Pure Velvet Campaign is timed to produce a record-breaking September and October.

INTRODUCED BY "Pure Velvet" CAMPAIGN

Get in touch with the Hotpoint district representative and see the dynamic plans now ready to help you get full benefit from the public interest in electric ranges generated by the large amount of national range advertising appearing in 1935.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

AND *Calrod* OF COURSE

It has been said by electrical men that the speed, durability and economy of Calrod, Hotpoint's new hi-speed heating coil, are the greatest factors in the success of the electric range business. This has been amply demonstrated in the popular nation-wide swing to electric cookery this year.

ELECTRIC *Hotpoint* RANGES
AND WATER HEATERS

For power transmission, railway signaling, building wiring, and many other purposes, Roebling Rubber Insulated Wire and Cable are available.

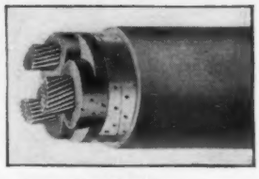
Plain Rubber 60% Sheath Power Cable. "SAFECOTE" Rubber-insulated and Braided Wires and Cables: Code, Intermediate, 30% and 40% Performance, 35% and 40% Performite. 40% and 60% Sheath Flexible Cords. Parkway, Service, Mining, Welding, and Control Cables; Tree Wire.

These will give you a fair idea of the completeness of the Roebling Line. They are made in a wide range of sizes and voltages. Armors:—steel, zinc, or bronze tape, or round steel wire.

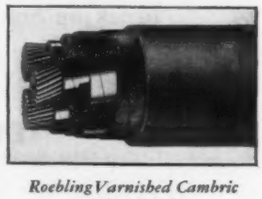
MANY OTHER TYPES

Power Cables: Paper; Cambric; Rubber » Station Cables » Slow Burning Wires and Cables » Weatherproof Wires and Cables » Submarine Cables » Portable Cords » Fixture Wire » Magnet Wire » And a wide variety of other wires and cables.

JOHN A. ROEBLING'S SONS CO. OF CALIF.
San Francisco • Los Angeles • Seattle • Portland



Roebling Paper Insulated Cable.

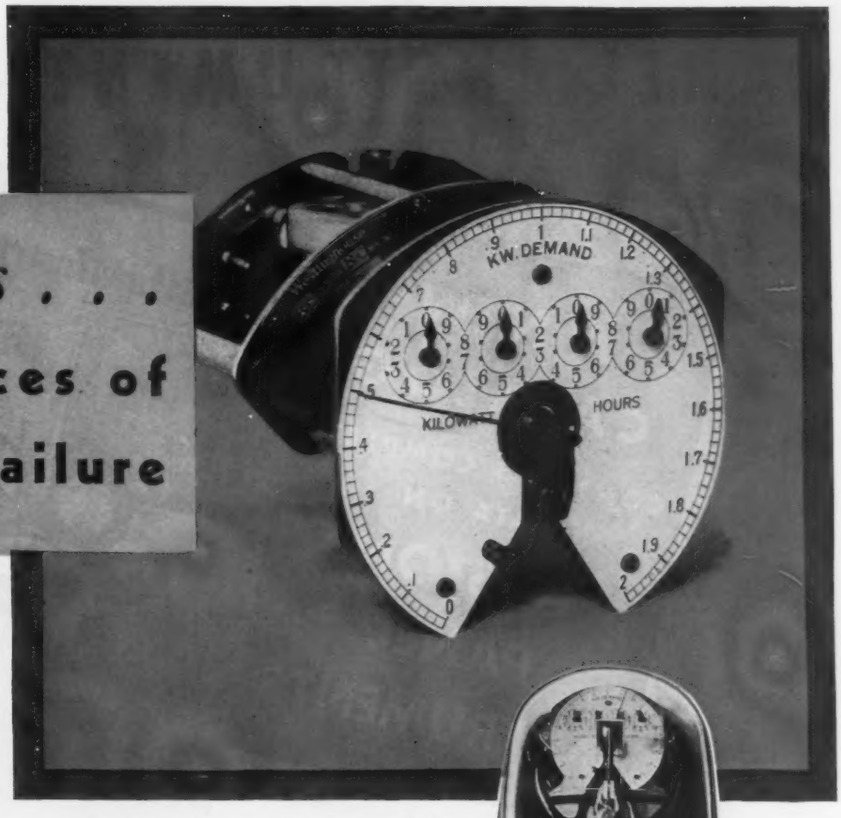


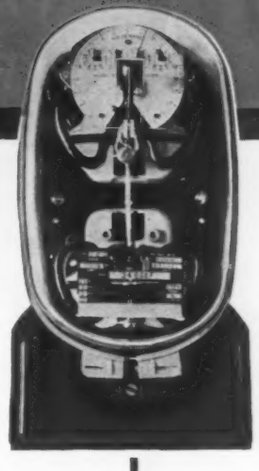
Roebling Varnished Cambric Insulated Cable.

ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING

NEW RW DEMAND REGISTER

Eliminates . . . Usual Sources of Wear and Failure





The RW Demand Register will fit all Westinghouse watthour meters manufactured since 1914.

● The RW is a new *block-interval* demand register that assures longer life and fewer operating failures because:

1—The synchronous motor in the RW is not used as a source of power to store energy for resetting - - it functions only as a timing device.

2—The energy required for resetting is so small that compensation for it is made in the meter calibration.

3—When resetting at the end of each time interval, a clutch is disengaged momentarily by the motor, permitting the driving arm to be returned to zero by a small control spring.

Wear is thus limited to the motor and its reduction gearing - - running without load. Long life of these parts is further assured by their operation in a reservoir of oil.

In addition the new RW has many other refinements important among which is the complete shielding of the synchronous motor field. This feature prevents any magnetic effect on the meter accuracy.

R 57026

SINCE 1888
METERS INSTRUMENTS RELAYS

Westinghouse

Here's **help** ON

PANEL INSTRUMENT PROBLEMS

Send for your Copy

For ready reference, WESTON has combined, under one cover, complete data on the 2, 3, and 4-inch line of panel-type indicating instruments. This new bulletin includes specifications, dimensional drawings, illustrations and prices of all AC, DC, rectifier type and thermocouple instruments, in both round and rectangular shapes.

Every user of panel instruments should have this booklet available whenever instrument problems arise. Copies now are available and will be sent to instrument users on request. Write to Weston Electrical Instrument Corp., 577 Frelinghuysen Ave., Newark, N. J.

WESTON *Instruments*

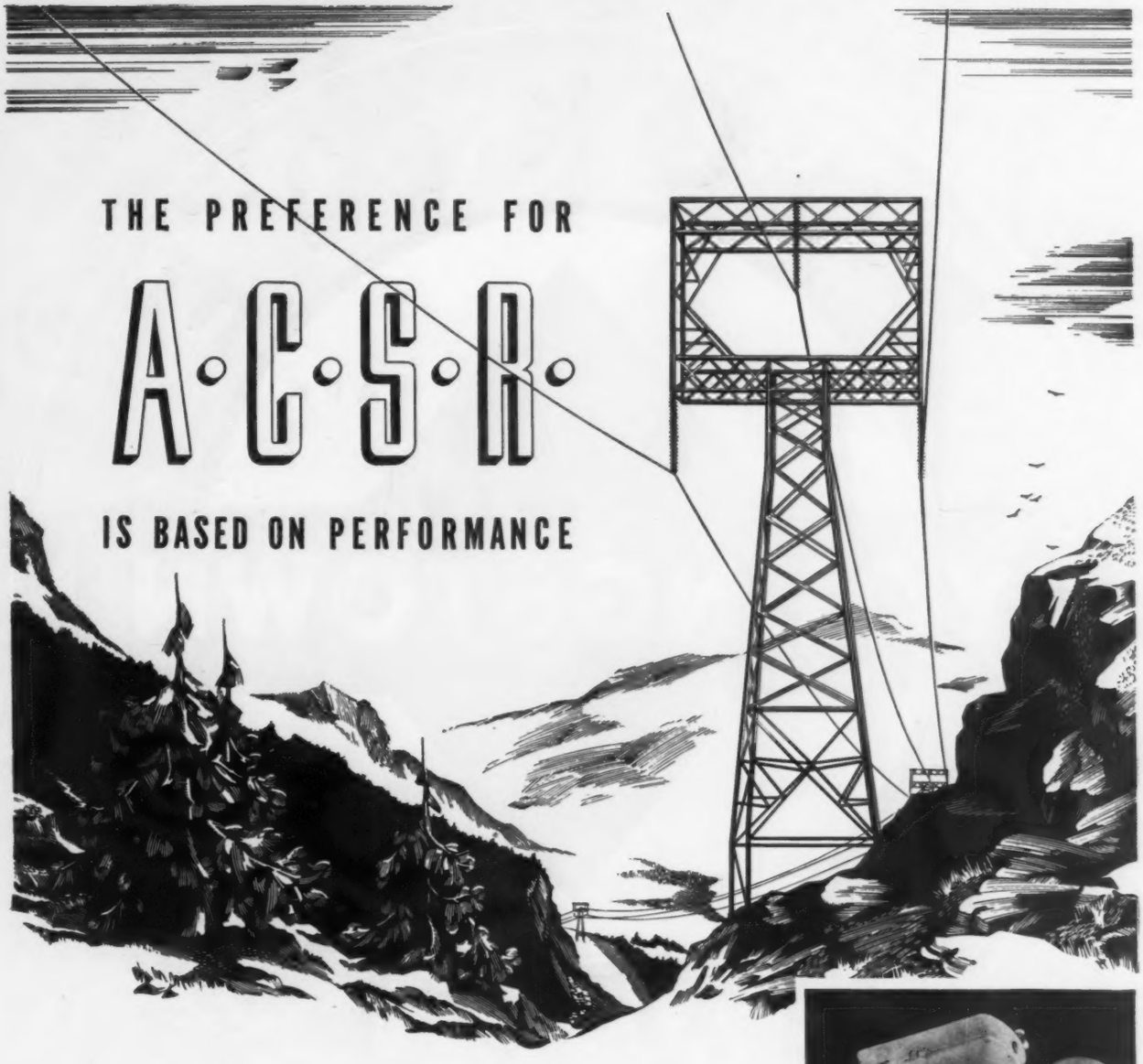
Eicher & Bratt,
263 Colman Bldg.
Seattle, Wash.

PACIFIC COAST REPRESENTATIVES
C. F. Henderson,
420 Market St.
San Francisco, Calif.

Electrical Engr. Sales Co.
Subway Terminal Bldg.
Los Angeles, Calif.

THE PREFERENCE FOR A·C·S·R·

IS BASED ON PERFORMANCE



● The dependable performance that has made A. C. S. R. the preferred conductor for transmission lines goes straight back to engineering fundamentals.

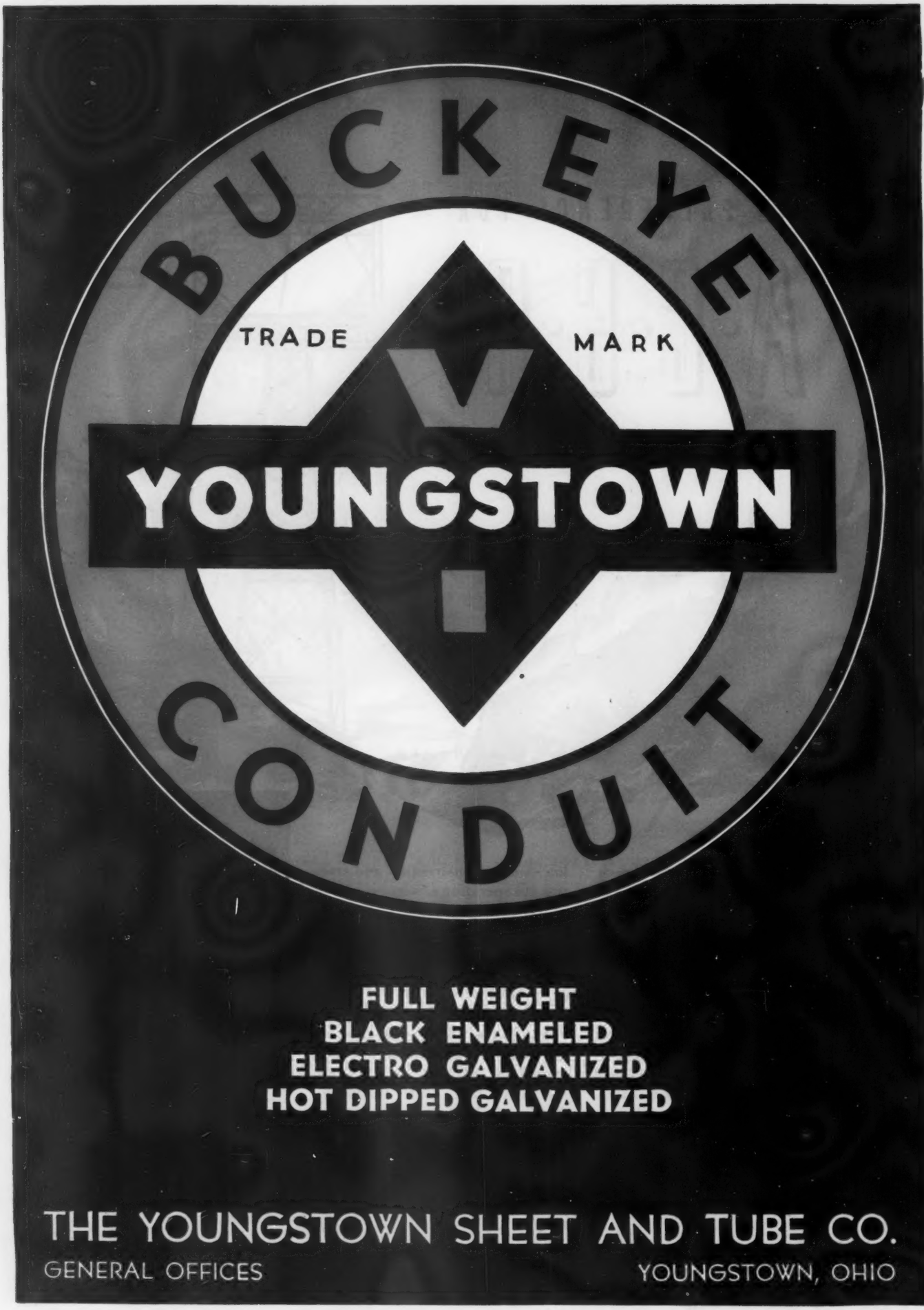
A. C. S. R. represents a basically economic use and disposition of materials to attain great mechanical strength, light weight, and superior electrical characteristics.

A detailed recounting of all the ways that A. C. S. R. contributes to original economy of transmission line design, construction and erection, to operating efficiency, and to year-after-year reliability would make a treatise. Your own experience has condensed the whole history of the theory and practice of transmission lines into one simple statement: "A. C. S. R. is Right."

As always, the co-operation of our engineering staff is at your service. ALUMINUM COMPANY OF AMERICA, 1832 Gulf Building, Pittsburgh, Pa.

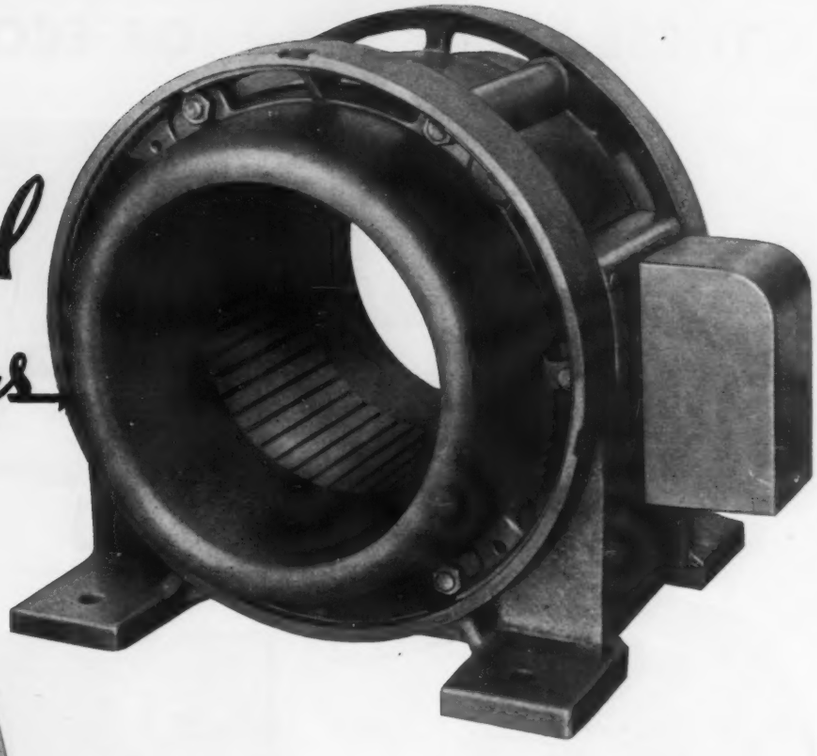
Outside meter boxes of Alcoa Aluminum cannot rust. Aluminum is highly resistant to atmospheric corrosion; needs no paint protection; never discolors adjoining surfaces. All boxes illustrated are die-cast.

ALCOA ALUMINUM


BUCKEYE
TRADE
MARK
YOUNGSTOWN
CONDUIT
FULL WEIGHT
BLACK ENAMELED
ELECTRO GALVANIZED
HOT DIPPED GALVANIZED
THE YOUNGSTOWN SHEET AND TUBE CO.
GENERAL OFFICES
YOUNGSTOWN, OHIO

SEAL-CLAD

Protected Windings



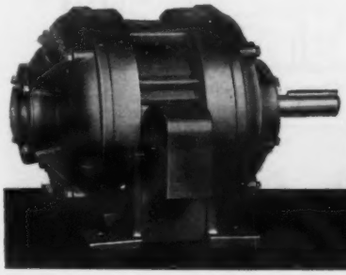
The New Motor with Permanent Coil Protection

The SEAL-CLAD motor with its moulded shields provides the ultimate protection to the windings against damage from Metallic Dust . . . Grit . . . Oil . . . Moisture . . . Mild Acids . . . and such other agents as are injurious to motor insulation. The stator coils, the most vulnerable part of an induction motor, are fully enclosed by means of hard, smooth Bakelite shields sealed over the coils.

Electric steel for frames and spiders makes Allis-Chalmers Induction Motors shock-proof and distortionless, without excess bulk. Silver-brazing makes A-C rotors normally indestructible. The insulation, the ventilation, the unit-locking of the laminations and all other factors have been carried to matchless proficiency by the many individual Allis-Chalmers features.

Allis-Chalmers builds polyphase induction, synchronous and direct-current motors to fit practically any type of drive with electrical and mechanical modifications to suit.

Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin



ALLIS-CHALMERS

SEAL-CLAD MOTORS

"LINE UP" WITH THE *Brass Bushed* HEMINGRAY FOR THESE 10 POINTS OF ECONOMY . . .

Brass bushed smooth threads for insulator pin.
Greater mechanical strength.
Sustained dielectric strength.
Unaffected by sudden temperature changes.
Withstand maximum insulator pin expansion.
YES, SIR, THEY'RE O.K.
Never age or deteriorate.
Controlled uniformity of product.
All surfaces impervious to moisture.
Tougher—withstand rough handling.
Clear and flawless for easy inspection.

HEMINGRAY INSULATORS

AMERICAN STEEL & WIRE COMPANY

United States Steel Corporation Subsidiary

Pacific Coast Distributors

COLUMBIA STEEL COMPANY

SAN FRANCISCO LOS ANGELES PORTLAND SEATTLE

Why the Trend Toward

UNIT SUBSTATIONS?

BECAUSE USERS HAVE FOUND THAT THEY PROVIDE SUBSTANTIAL ECONOMIES, IMPROVE SERVICE RELIABILITY, AND ARE ATTRACTIVE IN APPEARANCE.

HERE are a few of the many advantages that may be gained by the use of G-E factory-assembled unit substations:

1. **SAVE SYSTEM INVESTMENT.** Their use affords important savings in equipment, real estate, buildings, taxes, and distribution feeders.
2. **CAPACITY CAN BE QUICKLY ADDED IN SMALL INCREMENTS.** Therefore, capital investment and carrying charges are added only as needed, and system planning is greatly simplified.
3. **AFFORD BETTER SERVICE.** Feeder circuits are short, giving a higher degree of service continuity.
4. **PROVIDE GREATER SAFETY.** All live parts are metal-enclosed, affording maximum safety to life and property.
5. **HAVE ATTRACTIVE APPEARANCE.** Their neat, compact design permits outdoor installations in locations where the conventional outdoor construction would be objectionable or even prohibitive.

Operating records and experience during the last five years show that G-E unit substations have given these advantages and many others. Letters from users express enthusiastic approval.

We shall be glad to discuss with you the economics of unit-substation application for your specific conditions. Send for a copy of publication GEA-2078, which we have prepared on the subject. General Electric, Schenectady, N. Y.

310-7

GENERAL ELECTRIC

ELECTRICAL WEST

[*Devoted to the economic production, transmission and distribution of electric power and its application to industry, commerce and the home in the Pacific Empire, and to the sale and distribution of electrical utilization devices, equipment and appliances in that area*]

August 1935

Spectacular Lighting Feature of Fair

ELECTRICALLY conscious visitors to America's Exposition, otherwise known as the California Pacific International Exposition, at San Diego, will find a wealth of things of interest and of definite educational value, if they have but the patience to seek them out. Only those who rush through the fair on a one-day excursion get so hurried a glimpse as to render them critical or bring them disappointment. The more discriminating visitor, who examines and thinks through the obvious surface aspects of the fair, will come to realize that the fair is one of the most complete and versatile electrical exhibitions conceivable although the electrical industry had almost nothing to do with making it so.

Based only on the exhibits in the Palace of Electricity and Varied Industries, a cursory appraisal of the fair would be somewhat disappointing. The San Diego Consolidated Gas & Electric Co., the Southern California Edison Co., the Los Angeles Bureau of Power and Light, and the General Electric Distributors bravely carry the entire burden, aided only by such stalwarts as General Cable Corp. Mixmaster, Luminous Structures, and Kim's Magic Garden. Each of these exhibits is excellent and well worth careful attention, even if lack of support from the remainder of the electrical industry leaves this electrical display so small a part in so big a fair.

Electrically, however, the fair is a fine success. The electrical features do not come from the industry itself but from wide awake industries and exhibitors who have found electricity so versatile and so indispensable an ally. It is in these aspects that the fair will prove of profound interest to any serious seeker after ways in which to expand the uses of electricity. If this thought is borne in mind the fair will be found to contain a well stocked warehouse of ideas and applications of electricity.

Henry Ford, greatest showman of them all, uses electricity so profusely and so cleverly in his mammoth display building that it might be termed the best all 'round electrical display at the fair. It is at once an exhibit of the use of electricity in industry and in display and advertising. From electric furnaces, welding, operation, testing, and control come the Ford parts. Still not satisfied, electricity is used to explain, to illustrate, to illuminate and diagram all the features of Ford care and precision in manufacture. Ford uses the most ably designed architectural lighting, provides a music bowl with a lighted sounding board, and even supplies an electronic organ to perform in between the symphonies presented from its stage. Ford even pays tribute to Thomas Edison and shows a model of his first dynamo.

Just outside are the Firestone "singing fountains" whose sprays of water and colored lighting are synchronized to the volume of music being played throughout the grounds by the Associated Oil public address system that supplies music and announces events throughout the fair grounds.

Lighting creating a sort of fairyland with the extensive gardens and lush foliage in which this fair has its setting. The Spanish architecture also lends itself to romantic lighting effects. Although lighting experts probably will disagree as to the use of color so profusely on foliage, for dramatic effect Otto K. Oleson, who installed the lighting, left little to be desired. Inquisitive electrical men will search bushes and shrubs to seek out the sources for some of the lighting stunts.

A novel light treatment is made possible by the characteristic bunchiness of Eucalyptus foliage. One color is spotted on one bunch, another on an adjacent bunch, still others on similar natural groupings. The effect is exceedingly colorful. Another sight worth coming for is the heavily grown tropical palm canyon, lighted in rich colors and sprinkled with hidden lights that twinkle like fireflies. Lagoons and fountains have been added to lend reflection to many scenes. The long arched walks of the original buildings, remaining since the 1915-16 fair, are indirectly lighted in amber, which sets off in contrast the blues and greens used in adjacent gardens. Space forbids further description here.

Electricity in a wide variety of advertising and display ideas can be seen at work everywhere about the fair. These uses range all the way from the dignified and mysterious "Illuvision" of Standard Oil Co., to the bizarre ballyhoo along the Midway.

Attendance has been unusually large and seems to be growing as the season wears on. Even now there are exhibits being added and new attractions planned. One exhibit which can become of vital importance to the electrical industry is that of the home modernization program of F.H.A. In fact the fair is full of opportunities for the electrical industry. Imagination and application of such ideas to the furthering of electrical applications in the regular run of business will make a trip to the fair profitable to anyone at all electrically conscious.

Bill Jones Speaks + + +

about Fishing

THE Committee from the Contractors and Dealers Association hurriedly filed out of the manager's office just as Bill Jones edged in. The manager seemed flurried, he said:

"There is a typical example of the futility of trying to work with contractors and dealers. They're suspicious of the power company and of one another. They always want something more and never give anything. They seem to think that my company should underwrite their business for them, and that we should sit down and wait for them to build up our load instead of doing it themselves. Every company in the land has had exactly the same experience with these gentry. Untold effort has been expended to get dealers to cooperate, and every company has found that they are impractical. Starting out in life as wiremen they still are wiremen, and have learned little of business principles—hopeless."

"Perhaps," mused Bill Jones, "your idea of cooperation is very like that of a very famous politician who now sleeps in the White House. His notion of cooperation is for the other fellow to do all of the cooperating. Anyway, I have just got back from a fishing trip up North. Had a wonderful time, was out in the open and caught as many fish as I had any use for."

"Huh," said the manager as he turned impatiently to the papers on his desk.

"Thanks for your great interest," grinned Bill. "Of course, you are not a fisherman, very few of your sort of people are. You are more likely to enthuse over golf. Every small boy and every man, regardless of his financial or social condition, can go fishing.

Not everyone can make a fetish of playing golf. Things have happened to you and to me in this age of multitudinous books, newspapers, radio broadcasts and movies. We never pause to do any real sustained thinking. We read too much. We are entertained too much. There is neither time nor desire for contemplation and for meditation. Seemingly, the great masters of thinking all lived in past eras. Their thoughts were worked out laboriously but surely, and were not confused by the din of machine-made philosophies of the high-speed printing press. Fishing does give opportunity for contemplation, for meditation, for solitude, for communion with Nature, for clear thinking. Golf has done more to wreck industry at the top than has any group of politicians. Think it over, that is, if you have left any capacity for thinking."

"Bunk," ejaculated the manager.

"I thought you'd feed that way about it," said Bill as he slowly filled his pipe, having waited in vain for the anticipated proffer of a cigar from the executive desk, "and yet, I can imagine a hypothetical situation wherein an electric company and the dealers might effect such complete cooperation that there is not even the slightest rift in their relations; that the company neither has, nor needs, a single salesman; where the contractors and dealers do all of the load building and where the company, over a given period of years, has increased its domestic load and its saturation in a manner to justify sitting up and taking notice."

"Well, my imagination is not so vivid," grumbled the manager. "No company has ever successfully turned its sales over to dealers. Nearly everyone of them has tried it. It just doesn't work. Come in again some time and spring something new."

"Exactly," mused Bill. "I just got back from a fishing trip a couple of hundred miles North. Up there I met a manager from a small combination electric and gas company who has accomplished all of these things and more. Of course, I wouldn't expect you to learn anything from the story, but here it is as I was able to get it:

"Some years ago the company had a very vigorous and aggressive sales department; twelve salesmen on its staff specializing in ranges and refrigerators. In its anxiety to build load quickly, its methods were such that dealers had much to say about ruthless competition. Some even used such naughty words as 'unethical.' Anyway, the power company really sold a lot of appliances and the dealers sold relatively few. The contractors association went to the Legislature, shoved an anti-merchandising bill through the Assembly and just lost out in the Senate by a parliamentary fluke.

"Six months later the manager invited all of the dealers to a dinner. He opened up the affair by displaying a curve showing the vital necessity to the power company of rapidly increasing domestic load. He said in part: 'You tried to drive us out of the appliance business, now I am going to go out of it voluntarily and turn the job over to you chaps, but remember, the load must grow and it must grow satisfactorily. You have said much about the sort of competition my company has given you. Very well, from now on you will have none from that source. BUT, my offer has a string to it. I know what it costs my company to sell. If you can deliver the goods and build up the load as satisfactorily as we ourselves have done and at the same or less cost, the field is yours. The power company's interests are best served in the long run by a united and prosperous electrical industry—with emphasis on the '*prosperous*'—not by a discontented bunch starved into a condition where neither individual nor group initiative is possible. Whenever you sell anything you must make a profit. You must not ruin yourselves by exorbitant allowances on trade-ins. Any of your salesmen who make derogatory remarks to potential customers about the quality of any other dealer's line must be fired on the spot. You are all handling standard lines and the peddler who has to run down a competitor's goods isn't a salesman at all. I will pay half of your advertising, will give your salesmen a bonus of 50 cents per kw. of capacity for each range, providing it is not replacing a gas range. We are still in the gas business also, and neither bonus nor allowances for wiring will be used to replace gas. We will give a $2.00 sales bonus for each refrigerator, will furnish competent home service demonstrators for the conduct of cooking schools for any or all of you, and will pay half of the cost. Possibly more than half of it in some instances, and will give financial and other aid from time to time as you develop plans and selling schemes. We will furnish each of you with a sort of a code of fair practice embracing what I have said and many other things—not alone for the company's benefit, but more directly for your own. If you violate

this code you will not continue to receive the cooperation of the power company.' They accepted the challenge with a whoop."

"Yeah," said the manager, "they always do—at first."

"Well," said Bill, "the details are a long story, but here is a summary which may or may not interest you:

"Residential electric customers, 8,835; electric ranges, 3,278; electric range saturation, 37.1 per cent; average 12 months use per electric residential customer 945 kw.-hr. This is a combination company and 1,500 of those 8,835 residential electric customers cook with gas. It frowns on electric water heating. Three or four hundred electric water heaters would send that residential consumption skyrocketing. Only thirteen old ranges have been replaced by new ones in the past year. All are remarkably well sold. There are less than a dozen a year coming back on dealers' hands and all have lists of customers, waiting to snap up any which come into the market. Before this year will have closed, the electric range saturation will be over 40 per cent and that of refrigerators well over 44 per cent average kilowatt-hour per residential customer over 1,000. No rental schemes, no bargain rates whatsoever. As a matter of fact, all ranges are sold from $10 to $20, and sometimes more, *above list price*. There isn't a lift-top refrigerator on the lines and they are not even handled by the dealers. No fancy work, no campaigns, no elaborate planning. Just intelligent selling by a group of *prosperous* dealers who are delivering a coverage even in out-of-the-way places which no power company could match, and everyone of them a booster for the company. They are not fighting among themselves."

"Yes," said the manager, "that seems to be pretty good. A new broom sweeps clean and a new idea works for awhile, but how long does your friend in the 'sticks' expect it to last?"

"He didn't say. It has been working only four years thus far."

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Letters...

Reprints and Compliments For Goodwill Building

To the Editor:

Sir—Would it be possible to secure 100 reprints of Mr. J. A. Corlett's article that appeared in the July issue of Electrical West? I believe that if you would solicit the sale of reprints of this article as well as others in that issue, you could possibly make a small profit on the printing, but, which of course is of more importance to you, you would render a real service to the industry.

I consider this article one of the finest I have read on goodwill building and I want to compliment you.

JACOB A. KAHN,
District Manager.
General Electric Supply Corp.,
Salt Lake City, Utah.

Editor's Note: Would any one else like reprints for distribution to all of their employees? The type is being held.

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A New Name May Save a Life

To the Editor:

Sir—In the name of the patron saint of the electrical industry, I wish to enter a protest.

Why an umpty-steen billion dollar industry, boasting tons of high frequency brains, doesn't use some of those dollars and brains to coin a new term for "convenience outlet" is beyond me.

Year after year the good-will of the public is dampened, and the sanity of advertising and publicity writers is undermined by the repeated use of this unwieldy and ugly phrase. "Convenience outlet!" Look at it! Pronounce it! Certainly there must be a word or phrase that would become the mouth a little better. I warn you, some day one of us is bound either to explode, or quietly suffocate in impotent wrath over this uncouth name.

A rose by any other name might smell as sweet, but any other name for a "convenience outlet"—phew!—would revolutionize the industry and give new life to the contractors who install the things.

Can't you use your editorial prestige to rouse the industry to the menace of a name like "convenience outlet?" Start a contest or something and give a power-plant or a year's subscription to ELECTRICAL WEST to the noble soul who gives us a new deal.

Suffering Copy Writer.
San Francisco, Calif.

Editor's Note: Has anyone any good suggestions. This is one of those subjects about which there is plenty of talk but little action. If some one sends in a good name we may send them a prize—or something.

Give Your Salesmen Training

By J. C. Plankington
Northwestern Electric Co., Portland

It has been my observation that the large majority of electrical dealers and department stores offer little or no training or sales help to their salesmen. In few cases is there any system of follow-up or check against the salesman's daily effort. The man, usually is left to his own ingenuity and devices in working up prospects, a sales story and a system of follow through. With the super salesman (if there be such), the lack of direction, encouragement and follow-up will affect sales results far less than will be the case with the man without previous training.

Those who have had experience in directing sales realize that all salesmen are human and will sag in their application unless given constant attention and backing in their daily grind. They need to be encouraged when discouraged; picked up when down; patted on the back when trying; furnished with new ammunition when their presentations fail; in general, given every possible help and preparation from their employer.

Personally, during the past two years I have had this matter brought very forcibly before me. It was about two years ago that our company discontinued selling electrical merchandise direct and began passing all prospects or sales over to dealers. When this policy was adopted many of the salesmen who had been with us for several years were laid off. Very largely these salesmen found employment with local dealers. I have since talked with most of these men and they have told me of their experiences in their new positions.

Almost without exception these men have said that they were given little or no preparation before starting selling; usually given a price list and told to go to work; were furnished no prospects; were not permitted to do canvasing in the field, and there was no card record kept of prospects except insofar as the salesman may have kept one.

It may be expecting too much of the store carrying electrical merchandise as a side line to employ specialty selling methods. However, I am convinced that the dealer could very profitably devote more attention to the matter of improving sales methods in the selling of these specialty items.

The increase in national advertising and general popularization of electrical appliances, along with the government's program of propaganda in furthering the use of electric service in the home, should tend to encourage the dealer to accord electrical merchandise a more important position in his sales program.

Business Development Problems + + +

[*More of the prize winning problem paper answers in the Pacific Coast Electrical Association Contest*]

Explanatory Billing Will Improve Good Will

By C. G. BYRNE
Sales Department, Coast Counties Gas & Electric Co., Watsonville

Public Relations

Third prize winning answer to the problem, "What Are the Most Effective Methods of Increasing Customer Goodwill?"

CUSTOMER or consumer good will is just as necessary for the public utility as for the private business. The utility has a product to sell and while electricity is looked upon as a necessity for lighting it has not yet been put in that class when used for heating, water heating, cooking or to run numerous small home appliances. If the average electric utility had to depend on its sale of electricity for lighting, the absolutely necessary use as the customer sees it, that utility would not be able to do more than exist, if indeed it were able to do that. So, with a product to sell and a public which could use more of that product if properly educated, the good will of that public, both of present customers and prospective customers, must be sought, maintained and increased in every way.

It makes very little difference whether or not you have the best product in the world, if you as the dispensing agent are looked upon with distaste by your consumers your sales are going to be kept down to the lowest levels because of that lack of good will. Since the electric utilities are selling a rather highly competitive product for loads other than necessary lighting, it would seem that these companies perhaps more than others should search all angles of their business for methods of obtaining and increasing customer good will.

Bills are a Carry-over

One of the methods in which a utility may increase its good will is in its method of billing. By this we mean the way in which the bill is made out, the method of showing the customer how much he owes. The present day electric bill is a carry over from the early days of electrical service. It has not changed with the changes in electric rate structure. In the infancy of the electric business when a flat rate was charged, a single known amount was put on the bill and expected by the customer. The change in the method of selling energy has gone through several steps since those days. The meter was introduced to register the amount of consumption with a flat rate for each unit of energy used. Later the more complex rates with their service charges and sliding scale of price charges became generally used. But through all these changes most electric companies have continued to bill the consumer, as in the past, a single item showing the amount owed without adequate explanation.

It has been repeatedly asserted by consumers that the utility electric bill is the only regular monthly expense which does not tell them easily and quickly on the face of it how they have spent the amount it shows they owe. The telephone bill is a fixed charge with extras shown for long distance tolls easily discernible at a glance. The grocery bill is a statement covering purchases for which itemized tags have been issued. The milk bill is a single statement of so many units of milk at a stipulated price, the total being easy to check. But the electric bill, what does it show the average man? A line of cryptic figures ending in a sum which represents his use of electricity for the preceding month or billing period. Sometimes this amount pleases him, sometimes it causes him to gasp, but he has no easy, quick explanation for the total. He takes the word of a public service corporation whose word he has been told to doubt by various organizations and through propaganda of various sorts. He knows nothing about rates, about units of energy or ratings of appliances. He is hard to educate along these lines because he has neither time nor inclination ordinarily to listen to extended dissertations or read dry figures about them.

How then, can he be educated and his good will held and increased and his desire to use more electricity in his home be stimulated through his monthly billing? It is the feeling of the writer that this can be done first by simplifying the monthly bills and secondly, by educating the consumer through certain facts applicable to his monthly bill. The simplification of the electric bill, that sheet of paper which gives Mr. Customer his concrete evidence of use of electricity, is the most important.

Two Suggested Ways

There are two ways in which this simplification can be done. The first is by explaining on the face of the bill the rate on which the electricity was used and showing the customer how the

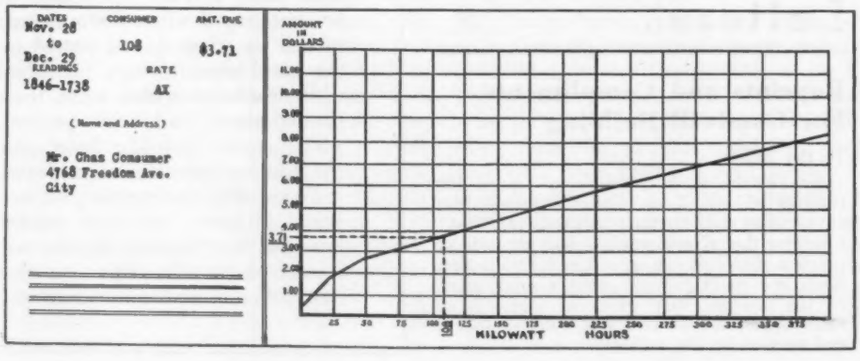

Fig. 1—Proposed graphic type bill to show consumer cost trends

amount of his bill was made up, and the second, by a graph showing on the bill the trend of the rate in dollars and specifically where the amount of that particular bill is on the curve.

This simplification of billing is designed particularly for the mass of consumers in homes, those people who use electricity on a complex schedule and who do not know what it is all about; yet that class of consumers who are well able to increase their monthly consumption if educated to it.

Simplification by explanation, the first type of bill, is the easier to understand. Suppose we take an electric rate which contains a 50c service charge, a block of 20 kw.-hr. at 05c, 30 kw.-hr. at 03½c, 150 kw.-hr. at 02c and all above at 01½c. Suppose also we have a consumer with a consumption in December of 108 kw.-hr. Normally his bill would be something like this:

This Paper Suggests—

That bills are mysterious and create suspicion, therefore the mystery should be removed by elaborating on the items of the rate, even if it does cost more in time and effort.

An educational campaign to show what electrical energy can do in terms of lessened labor and increased enjoyment, and to compare electric value with other items of household expenditure.

DATE		PRESENT READING	PREVIOUS READING	CONSUMPTION	RATE	AMOUNT
Nov. 28	Dec. 29	1846	1738	108	AX	3.71 el

To show the customer how the $3.71 for electricity has been figured, a simplified bill would look like this:

DATES
Nov. 28-Dec. 29
READING
1846—1738
CONSUMPTION
108
RATE
AX
AMOUNT DUE
$3.71

Between the dates printed on the left you consumed 108 kilowatts of electrical energy on rate AX. Your bill was arrived at through the following rate charges:

(Name and Address)

Service Charge					$ .50
First	20 kwh	@	.05	—20 used	$1.00
Next	30 kwh	@	.03½	—30 used	1.05
Next	150 kwh	@	.02	—58 used	1.16
All over	200 kwh	@	.01½	— 0 used	
Total	108 kwh				$3.71

This need not be the actual set-up of the bill, yet placed on the sheet of paper the above information should be shown. It is nothing more than an explanation of the rate and a breakdown of the rate as applied to that particular bill for that reading period. It does, however, bring to the customer a clearer idea of how the total was figured.

The rates are public, they are on file and they have no features which should be concealed. The more the utility can get them before the public in a correct light the more will be the public acceptance. It might be thought that the service charge should be concealed or that the first high block of energy brought down to an average with the lower blocks, but it seems to the writer that the cleaner and clearer we can show the rates the more they will be understood and accepted.

A Graphic Bill

The second type of bill, constructed to educate the consumer and simplify the present electric statement, is a bill showing a graph of the rate, units of energy against dollars spent. This bill would not be as simple for the average consumer to read, but would open up more opportunity for increased use of energy through its ability to show how increased use could be had for less money per unit. The bill would necessarily have to have those dates and figures required by regulation but should show a graph with the locations of the amount of that bill on the curve.

Suppose we take the same rate as used previously and the same consumer. Then his bill would appear something like that shown in Fig. 1.

As previously stated this type of bill, while not as simple to understand as the first, gives much greater opportunity for the consumer to see quickly the trend of the costs of his rate and its tendency to flatten out and give more for the money when used in larger quantity. This would perhaps tend to give the customer more confidence in his utility and show him that each bill is actually figured out for energy consumed each month and not for whatever figure the company thinks he is able to pay. For there are many people, and fairly intelligent people, too, who believe that the utility charges all the traffic will bear, dealing with each case the limit of that person's ability to pay.

The above sample of a graphed bill is, of course, very crude as this paper is written for the sole purpose of putting forth these ideas as means of increasing public good will and consequently increasing the use of energy. Probably in the hands of one qualified to set up a bill of this type, its appearance would change greatly. However, the idea should be there, showing the consumer where his particular electric bill comes in on the curve of energy used under the rate for his establishment.

An Educational Campaign

Along with the simplification of the bills should go, hand in hand, an educational campaign, designed to bring out several facts: First, to show the customer what electric energy can do in terms of household appliances and their ability to bring a lessening of house work and an increase in life enjoyment. Second, to compare these costs and their advantages to the total bill and other items of household expenditures. To little effort has been made by electric utilities to force home to their consumers the comparative costs of using home equipment to the joys derived therefrom.

Further, this campaign should make him face squarely the facts of decreasing energy costs in the face of other rising commodity prices. It should bring home to him a fact which has been overlooked by the utilities in their educational efforts, namely, that the increase in electric service in his home in the last few years is the cause for the increased amounts paid for energy; that his radio, refrigerator, ironer, etc., brought him a higher electric bill monthly, not an increase in rates. Acquaint him with the units of energy he is buying and their increased ability to serve his appliances today, due to decreasing rates.

Finally, it should show him something of the type of service he is getting. Instantly available from one day's end to the next, ready for emergencies, standing idle at his elbow set to go with the turn of a switch, it should be compared with other commodities of similar costs but entirely without these service values.

This type of campaign should be carried on by educational stickers attached to the bill. They should be terse, informative and above all, interesting. Each should deal with one fact or item alone and have that fact simply and boldly brought out. In these days of rush, the majority of folks do not want to take time to go into any exhaustive explanation of facts and figures. They will not get them in their minds correctly if they are dry or long drawn out. It is true that it is hard to catch the attention of people with the over-ad-

vertising of the present age, yet with the bill the utility has a fine means of catching the eye, especially if an odd or colorful or out-of-the-ordinary sticker is attached to that bill.

Prime the Employees

Last, but not least, along with these educational bombs should go a method of keeping the employees of the utility on their toes with each fresh explosion. Too often a fine campaign is started by a utility to give some special knowledge to the customer and it loses half its value and force through ignorance on the part of the employees of the utility concerning that particular campaign. Not only should those at the counters where bills are paid and complaints received, be thoroughly grounded in the purpose and particular details of such an educational campaign, but the men turning meters on and off, the men on the service wagons, the mechanics doing installation work, yes, and the men on the line crews should have a working knowledge of such campaigns. They should have had a chance to study and discuss various phases of the entire program that they may be able to answer questions of interested customers and be able to give further information to those customers.

The ideas here set out have been brought out solely from the standpoint of increasing the good will of the consumer. No thought has been taken of the problems that such changes in billing would throw on a billing department. After all, the average utility is ready to spend, and does spend, quantities of good coin in its effort to increase its output and decrease its percentage of dissatisfied consumers. Why not put some of that money to work where it is sure to accomplish good? Why not use it on increased costs of billing if in that way more energy will be used because the customer is better satisfied with the explanation he gets of how he spends his present bill.

And so we have the setup for increased customer good will. Let a simplified bill be presented each month to the customer; an account of his expenditure which he can figure out and check. Let it be an account which, through educational stickers with his bills, colorfully and tersely brings this to his attention, so that he gradually comes to see is not only a legitimate charge but very small one for the value received. Render it a monthly expenditure which, with the additional explanations offered by a well informed and tactful group of employees ready to give those explanations in a helpful manner, will doubly assure the customer that his bills are correct and that he has used the energy in a definite way and that he cannot get more for his money in any commodity now on sale to the public.

Domestic Electrification Must Begin at Home

By DAVID S. BROMLEY
Station Chief, Southern Sierras Power Co., Bishop, Calif.

UNDOUBTEDLY it is a trite statement to say that this problem is one of the most important confronting the electrical industry today. In this field are the greatest number of potential possibilities for increased use with perhaps the least expense from an operating point of view. In other words, the present distributing facilities with very little change will take care of a great increase in demand.

Start at Home

It appears to this writer that the first and most important step is the selling of utility employees on the economy, efficiency and safety of electrical equipment. Perhaps this safety is sold to them at present but unquestionably a great doubt exists in the minds of many employees as to economy and efficiency. A lack of attention to these points by officials and commercial managers has brought this about. In fact one does not have to seek far to find power company officials who question these two points in electrical apparatus. A utility can not expect to sell its consumers a service in which its own officials and employees do not believe. It is something like an automobile salesman driving up in a Model T Ford to try to sell a Lincoln.

Of necessity we must assume that in satisfied users are our best salesmen and satisfied employee consumers are too few and far between. Too often when employees purchase electrical equipment they are not schooled in the use and operation of the equipment and in consequence the kilowatt-hour consumption is high and the efficiency is low. It should be remembered that the great majority of utility employees in the regular course of their work do not learn the proper care and operation of electric household equipment.

There are perhaps 100 engineers, office workers, and linemen employees to every salesman or commercial agent and these are valuable contact people to the sales department. Effort should be made to sell them convincingly on the advantages of electrical equipment. It is not enough merely to prevail on them to buy such equipment. They must be schooled in the operation of the equipment so that they become naturally enthusiastic about it. Mrs. Jones, the wife of a lineman, can do much to promote sales and will naturally do so if she is operating an electric range and is satisfied with it and, correspondingly, she can unconsciously build up an unsurmounted barrier for the salesman if she is dissatisfied.

This then is the first step toward consumer electrification. Make every employee and his family a potential booster for electrical merchandise.

Most utilities at various points have on their system housing facilities for some of their employees. It is a regrettable fact that many such houses are equipped with cooking and water heating equipment other than electric. One can readily picture the stone wall that the salesman encounters when he tries to sell an electric range to a friend of an employee who is living in company quarters so equipped. True, this condition in a great many cases has occurred because of the fact that in the original provision of these quarters electricity was not available. Later, when the service became available, the expense of changing the equipment was not commensurate with good operating practice. This point has been passed over, yet if the utility is to continue to build its residential load every company furnished employee house should be equipped with electrical equipment throughout. The schooling of the operators of such company owned equipment is just as important as with other employees or consumers.

Dealers and Utilities

Unfortunately it has been the tendency in the past few years to allow dealers and utilities to draw apart rather than to come into closer cooperation. The dealer feels, and many times rightly, that he is being discriminated against. Of course he has frequently argued that all merchandising should be turned over to him because the utility obtains the load in any case and the sale of service is its primary interest. We need not even consider such a radical step, but certainly there is a happy

medium upon which the dealer and the utility may meet to the benefit of both.

If the utilities' merchandising is so arranged that the dealer cannot compete profitably, both lose, the company in added revenue and the dealer in sales commissions. The interest of the dealer is the interest of the utility and the attitude of the utility toward the dealer should be one of helpfulness rather than antagonism.

Educate on Rates

An educational campaign regarding rates should be conducted by the utilities both for their employees and for the public. We of the industry who are in constant contact with rate problems know that rates are not exorbitant, but there are many employees who hear only the consumers side of the question and in consequence are convinced that rates are high. It is not enough to state that rates are 30 per cent lower than they were in 1913 or that the trend of electric rates has been constantly downward.

Long articles are useless because they reach only the small percentage who are interested enough to read them. Short concise statements with side references to the proof of such statements will have a more far reaching effect. Short paragraphs citing comparisons of electric costs to other commodities will be read by thousands where long ads are read by hundreds. The great majority of people read only the advertisements of the things in which they are directly interested. Too few people are interested in the major electric appliances because they are thoroughly convinced that such equipment is beyond their reach, owing to high prices of both the merchandise and the service.

Water falling drop by drop will eventually wear granite, whereas the same volume of water dropped at one time will have no appreciable effect. Correspondingly, a statement that is kept before the public constantly by clear short reasonable statements will eventually have its effect. The modern housewife has at her disposal a servant more powerful than the Genii of Aladdin ever were to relieve her of the drudgery and monotony of household tasks. She has this servant for less than is spent by the average household for cigarettes. However, she has become so accustomed to this servant that she takes him for granted and forgets all the hours he spends working for her. She can see only the dollars and cents which his services cost.

Electricity is not costly and there is no dollar spent for which so much value is obtained. The consumer must be convinced of this before the electrical industry comes rightfully into its own.

A Competitive Line

There is also the question of the first cost of electrical equipment, which cost is often a barrier to sales. In the first place the list prices frighten the consumer and while we grant the justice of these prices we must try to see them from the buyer's point of view. Electric household equipment is usually a thing of beauty and something to which the owner may point with pride. But other equipment may be purchased at a much lower initial cost which will do the work more or less satisfactorily. Manufacturers should add to their line sturdy, well constructed, unornamented equipment which may be sold at a price which will compete favorably with fuel equipment.

To summarize then, there are five primary requisites if the power industry is to reap the full harvest for its years of husbandry:

First—The education of its employees, as to the true values of the service it sells.

Second—The education of its various departments not directly concerned in the sale of its products as to the economy and efficiency of its products.

Third—A program of closer cooperation between contractor, dealer, and utility.

Fourth—The education of employees and public that electric service is not only the best service obtainable but that it is economical.

Fifth—A line of merchandise which will compete favorably with the price range of fuel equipment.

If these five barriers are surmounted the electrical industry will know a reign of prosperity which has never been equaled in history, a prosperity which will put profits in the pockets not only of the utilities but of the dealers throughout the land and will give the consumer the finest, cleanest, safest equipment that can be bought, at a cost which will steadily decrease as the universal use increases.

Domestic

Third prize winning answer to the problem, "What are the Most Effective Methods of Increasing the Domestic Use of Electricity?"

Overhaul the Sales Machine to Improve Power Sales

By W. R. BOWLER*
Gas and Electric Sales, Pacific Gas and Electric Co., San Jose

WHAT are the most effective methods of increasing the commercial, industrial, and agricultural uses of electricity?

The answer to this problem is a complex one, due to the fact that there are many contributing factors that now retard expansion.

Space does not permit covering the details of this entire problem; however, I will enumerate what I believe are the salient points and endeavor to explain them by specific examples in each case.

Properly Execute Sales Programs

First and most important, the electrical utilities should put their houses in order. The higher executives of utilities are sales-minded and the sales departments are endeavoring to do an excellent job; however, the sales department is usually so hampered by the influence of regulation from the other departments that they are compelled to work under serious handicaps.

I can best illustrate this by citing a specific case. Recently, a utility conducted the finest water heating campaign I have known from a load-building standpoint. The water heater sold installed, for we will say $75.00. The cost to the company was about $100.00, installed, including salesman's commission or a net merchandise loss of $25.00. Terms as high as 36 months, with no down payment, and six months deferred billing were offered. Owing to the fact that a water heater, when installed, becomes real estate under California laws and fearing there would be a few losses due to non-payment, the credit department insisted on each sale agreement being signed by the holder of the mortgage on the consumer's property, or the owner if the consumer

* Since this was written Mr. Bowler has been made division sales manager, DeSabla Division, Chico, Calif.

were a tenant. This was done in order that the water heater could be repossessed in case of non-payment. Imagine the embarrassment of a consumer in good credit standing, with a small mortgage on his property, who had to appeal to the mortgagor to sign the agreement in order for him to purchase a $75.00 water heater on terms. Likewise, picture the discouragement of the salesman who had to spend time, energy, and money in the form of transportation in order to get the agreement countersigned. With only a $10.00 commission payable, this extra routine cost the salesman all his profit in many cases.

The primary purpose of selling water heaters was to put them on the lines in order to sell kilowatt-hours, even though they had to be sold at a merchandise loss. If properly organized, a budget should have been provided to take care of the relatively small loss incurred by the few repossessions which would have resulted, in order that sales could have been made without excessive red tape.

This is rather an extreme case, but is typical of the friction which may exist under present conditions and serves to explain what I mean when I say more coordination should be effected within the utility's own organization in order to do a better job of load building.

Proper Equipment for Each Application

More action should be taken in supplying suitable electrical equipment that will serve the customer's needs.

For example, the largest potential field for commercial cooking is the small and medium sized restaurant and eating house. Heavy duty equipment on the market today is exhorbitant in price and is entirely unsuited for the smaller eating places, especially short order houses. Canned gas, even though expensive, is far superior for all top cooking in this class. A fast, flat-top griddle type range that can be purchased at near the price of good gas is needed.

This is only one of the many possible uses that await closer cooperation between the manufacturer and utility to develop additional use of kilowatt-hours.

Simplify Rates

Rates should be simplified to a point where the average individual can understand them, and proper education be given the consumer on the value of our service.

Our industrial power schedule with incidental lighting, is a good example. If lighting is incidental to power, I see no reason why a consumer should be penalized for using it through the power meter. It is a desirable load when it is off peak, as it has an excellent power factor. This feature of the rate is seldom understood by the customer and discourages further development of industrial lighting.

When the connected load in lighting is confined to 20 per cent of the connected load in power, lamp sizes are often reduced and circuits which can be spared are disconnected. All this cuts down on consumption of kilowatt-hours. It would appear that demand would be the only determining factor. The mere fact that a great many sockets are connected does not affect service facilities if they are not in use at the same time. For example, I know of a large laundry that formerly used 300-watt lamps throughout the building for approximately five hours per day for the evening clean up. These lights were never on during the daytime when the motor load was operated, and in no way affected the plant demand. In order to come within the 20 per cent feature, the 300-watt lamps were replaced with 75-watt lamps with a corresponding loss in revenue.

As another example of rate complication, let us examine the account of a large electrically heated school with a connected load of 300 kw. Because this consumer has 20 hp. in motors which are located so that it is physically impractical to separately meter the motor load, the account is billed on the general power schedule instead of the heating schedule, resulting in a loss to the consumer of $500.00 per year. This is necessary because the heating schedule permits only 5 hp. in motors to be combined with heating. Why not allow the horsepower that can be combined a percentage of the total heating load—in keeping with good business—instead of leaving this installation a vulnerable prospect of the oil man.

A third example of where rate complications seriously hamper our standing with the customer and result in loss of business, is that of our agricultural power schedule. The service charge type of agricultural rate is a just and fair rate to those of us who understand it, but nine out of ten farmers are not satisfied with the explanation of the service charge. If this form of rate is continued, I believe it can be made more satisfactory in the eyes of the farmer, first, by further education as to the reason for the service charge type of rate; and second, by permitting domestic air heating and water heating to be used on a double throw switch or automatic load-limiter. The average agricultural pump is used less than 2,000 hr. per year, so why not give the customer the benefit of low cost kilowatt-hours and build our load factor?

Rate application in the agricultural field many times discourages new business and builds prejudice toward the utility. For example, our agricultural schedule is available only on an annual basis. I know of at least a dozen installations in this immediate vicinity that are using gasoline engines to pump for 12 hours per day not exceeding 30 days per year from creeks which only run for a month or two during the winter. These pump users would be willing to take service on the industrial power schedule and pay up-and-down charges for the period of pumping, but cannot afford to pay a full year's service charge. If one of these same persons were to pump water for a duck pond for sporting purposes instead of irrigating an orchard in order to make a livelihood, the general power schedule would be granted. The amount of revenue lost in this case is small, perhaps, but the lack of understanding of our rates on the part of those affected certainly has far-reaching results.

The foregoing three examples of rate complication, I believe are convincing

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Power Uses

Third prize winning answer to the problem, "What are the Most Effective Methods of Increasing the Commercial, Industrial and Agricultural Uses of Electricity?"

This Paper Suggests—

Better coordination between internal departments toward a sales program.

New equipment within the price range of the market for small commercial establishments.

Simplification of rate schedules and more adaptability of rates to specific problems as long as the principles of the rate are retained.

A more stable sales program with fewer annual changes of the entire procedure.

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proof that we need simplification of our rates to a point where we can sell the public on the justification of them.

Long Term Sales Programs

Utilities have at their disposal very high type men for their sales forces because the utility is looked upon as a stable organization that will provide a steady income for the worker and an opportunity for the future. The average new salesman takes his work very seriously and applies his best efforts for a few months in order to become a specialist in the particular branch of sales he represents. Within a year, he is a very competent representative in his line and at this point a new sales plan is developed and the salesman is necessarily changed to some other activity which he knows little or nothing about. Again he applies himself to his new task and when another year rolls around another sales plan is issued, in much the same manner as automobile or clothing manufacturers produce new models or fashions every season.

In addition to adjusting himself to a new line of sales at least six weeks are lost in uncertainty because of the expectation of a new plan and six weeks are used breaking in under new circumstances. This leaves only about nine months out of each year of efficient work for the average salesman.

Changes are necessary in order to take care of varying conditions, but why not make these changes a little at a time, in order not to upset the morale of the entire sales department? Utilities today are thoroughly sold on an adequate sales department, so why not assure the salesman in the field of this by having a continuous sales program instead of a new one each year? This, I believe, is a way to build more kilowatt-hours without additional expense to the utility.

I have not mentioned lower rates, as it is obvious real low rates would greatly increase kilowatt-hour consumption, but unprofitable sales are not the answer to the problem. Lower rates will automatically follow if we can find the answer to our problem and produce the revenue to justify reductions.

Conclusion

After we have run an automobile 60,000 miles we wonder why it doesn't pick up maximum speed as it did when it was new and in good shape. A diagnosis usually shows not one weakness, but several, such as piston rings, valves, spark plugs, and bearings. Likewise, with our load building today there is something wrong. Certainly there is a potential market here even as there are many roads on which to drive. We need to overhaul our machine. I believe we can put our sales machinery in fine shape to build our commercial, industrial, and agricultural load if we execute efficiently our sales programs within the utilities without excessive red tape, see that the proper equipment for every application is available, at a reasonable price to the customer, simplify our rates, and get behind the utility sales departments on a long-term program.

Cooperation Attainable by Organizing the Industry

By W. F. JONES
Accounting Department, Southern Sierras Power Co., Riverside, Calif.

THE field of cooperation within the electric industry is nothing short of that wide range embracing all phases of cooperation in a public service and reaching from the five and ten cent store to the holding company of a large electric corporation.

Complete cooperation can not be effected. Yet cooperation of divisions of the industry most assuredly can; whether it be the manufacturers of receptacles, the producers of turbines, or the companies selling electric company securities; but only to the extent of their respective divisions, as quite naturally, conflict in trading, producing, and distributing policies will originate if not so segregated.

It is generally concluded, however, that when cooperative methods are sought, that the interested parties are usually the producers and distributors of good grade legitimate products who seek protection under cooperative management to safeguard their advertising and legitimate policies against the unscrupulous pirates who avail themselves of the other company's well meaning policy to serve the public well and honestly.

We have the legitimate contractor, the honest producer, the dependable wholesaler or jobber, and the reliable distributor backed up by a conscientious power company. It is on this basis that we will assume that cooperative methods are to apply for the protection of capital, its earning capacity and reputation and that the end they are all working together for is the common object of delivering satisfactory electric service through a multitude of appliances.

Cooperation

Third prize winning answer to the problem, "What are the Most Effective Methods of Increasing Cooperation Within the Industry?"

The Keystone

The old adage "In unity there is strength" should be our keystone. Each inter-related interest should bear upon this principle. Honest merchandise and service at a legitimate profit should be the mortar to secure our divisions to this *keystone*. The divisions should represent the blocks that make the bridge to tie in dependable electric service and the public.

The blocks are the divisions of the industry; each bearing its equal share of dependability and quality to sustain its neighbor.

The bridge to span the gap is composed on the one side of dependable electric service and on the other by dependable electric servants.

The component divisions are represented on the one side by sound electric companies with their dependable producing and distributing equipment, supporting the block of legitimate rates and service given. This is offset on the other side by the economical value of the consuming products and the policies of good trading, and business ethics.

Affiliation of these interests is necessary to accomplish the maximum efficiency of dependable electric service.

To accomplish this desired result of cooperation in the industry something more definite must be accomplished than the organization of an association to band together homologous attributes.

The creation of activities, programs, conclaves, meetings and discussions, all serve their purpose in the particular branches of the industry for their advancement, but they do not supply the present need for an organized department or departments to carry out the

result of these discussions or apprehensions to a fundamental basis.

A concrete or physical administration to carry out the plans, policies, or suggestions of the members of this association should be created. It should set out to accomplish the desired result under issue, and if necessary a Bureau created as a result thereof. This bureau may assume the responsibility of standardizing the requirements of utility companies service. It may likewise assume the same responsibility of standardizing the requirements of utility companies service. It may likewise assume the same responsibility as to producers merchandise, to warrant the placing of a stamp of approval that may be necessary to convince the prospective or present customer or consumer that he is getting the best obtainable value for the least sum. Human beings are strange creatures at best and good things must be earmarked to distinguish either the service or the product, and to convince them that it meets with the approval of a board designed and operated for their benefit.

A Hallmark

The "Good Housekeeping" star means a lot to most women; it is the earmark of a service department of a publication. How much more effective for electrical appliances would be the stamp of approval of, say the "Electrical Research Bureau," a bureau sustained by the Pacific Coast Electric Association and/or affiliated organizations to standardize first grade electrical appliances and service. A brand of character would be placed on all goods approved by the Bureau.

The establishment of a cooperative plan, operating on a pool basis, for advertising member firms' products by the centralization of advertising departments, circularizing and campaigning, or research, and service would do much to minimize the selling costs of products. An electrical page could be set aside to illustrate and advertise members' products and merchandise in the standard periodicals. Each member advertiser would pay its pro-rata of the space occupied. Or as applied to the electric companies, a combined advertisement of the electrical companies of the West could be inserted in the eastern and national business magazines. Through Chambers of Commerce and manufacturing associations, manufacturers could be advised of the advantages of establishing their business, or at least their western division of it in California by virtue of the available low rates existing.

Selling through cooperative methods should be our first step to nationalize the cheap power in the West. It would automatically encourage industry. So we must work together in unity for a bigger and better electrical West.

Specialization and concentration of efforts through the medium of such a centralized agency would not only reduce selling costs to a minimum but by proper establishment would create in the minds of the public the fact that at last a sound institution had been founded.

This Paper Suggests—

Organization of the various branches of the industry into a great, comprehensive association with departments to produce definite industry results.

A hallmark to identify tested and proved appliances which the organization can back with the public.

Pooled advertising and promotion expense to get the best results from a coordinated advertising campaign.

Compilation and use of statistics for the guidance of industry programs.

An united opposition to the attacks being made upon the industry.

The Bureau could have an agricultural department where electrification for each type of farming would be covered. This would be supplemented by electrical demonstration weeks at various towns, with advisory boards to direct the consumer into the most efficient and economical avenues to reach his particular needs. Demonstration farms would be erected at which all types of pumps and appliances could be inspected and prospective purchasers given all of the assistance necessary as to rates and service. Such a Bureau would become as necessary as a state institution, and the service rendered would demand from the state and municipalities, as well as the public, the same recognition, respect, and approval as accorded by the state and civic bodies to the automobile clubs.

The Sunkist, Sunmaid, and walnut growers associations are demonstration and proof enough of the economy and soundness of pooling interests. Comparatively, our interests are so much greater, the need more vital, and the results to be obtained more efficacious than the plans as applied to these industries.

The Bureau could send out circulars to consumers of the various power companies who may be antagonistic, or dissatisfied with the service or rate of service under which they operate, inviting them to bring in their problems. It is a known fact that when farmers or industrialists are offered an opportunity to discuss their situation with outsiders they feel more at liberty to express themselves. If tactfully handled, and by the adoption of appropriate corrective methods, this would tend to strengthen their appreciation for the utilities and manufacturers in general. Then again we may have the housewife who doesn't understand all that she should know about that new refrigerator she wants to buy and who would certainly appreciate buying from or through the Bureau where she can see all of the makes side by each, with a capable demonstrator instead of a knocker to give her the unbiased advice she is looking for.

Many cases of dissatisfaction with customers arise from the fact that the utility company employees are not capable of giving the desired information. Together with unruly and untactful handling this creates a bad impression. The Bureau would employ selected specialists in their particular line of work who would inevitably prove to be a boon to both customer and company in this respect. From the standpoint of efficiency and economy no one can doubt that combined and specialized efforts would bring about more desirable results than disorganized and conflicting policies of companies, whether engaged in the utility or manufacturing phase of the industry. To say the least they would cut down to a minimum the overhead and selling expense.

Valuable Statistics

Statistics prepared by the Bureau would be invaluable to both branches of the industry in determining the estimated value of new fields of activity. The compilation of statistical data may be carried to a degree of inestimable value. By concentrated effort the specialists in each of the respective fields would be able to advise both manufacturers and Utility companies of errors in policy, and make suggestions of tried out policies applied by other concerns with success.

The present advances in material costs, while causing no immediate alarm and which are indicative of a general prosperity trend, if properly charted through such a Bureau or clearing house would show purchasing agents that it was time for a very definite action, and materially assist in

making better operating and construction estimates. Statistical data could be prepared and made available to compare and ally consumption with maintenance, distribution, and other costs applicable to specific areas with concurrent ratios of net income to investment, gross sales to investment, maintenance to fixed capital, or funded and other debt to fixed capital, etc. This would be used to determine indexes, averages, and chartings for comparison, in order that trends might be determined and general characteristics of the business made available for reference by the member companies to assist in budget preparation, construction, or revision of policies.

For the utilities particularly, we find that no statistics are kept that would bear out the operating efficiency through standards of distribution economics. Applied statistics is the medium through which we must work in the future. The fallacy of keeping books and records merely to satisfy the demands of the commissions under whose jurisdiction we may be operating or for the purpose of preparing our federal income or state franchise return is scientifically wrong. It is true that books and records must be kept in accordance with the prescribed practice and accounts, but that is only for the purpose of assisting the respective bodies in their work and not to assist in the operation of the company. In short we should revise the accounting status and keep the books for the benefit of the company, from which we can derive the information necessary to satisfy the respective bodies.

Centralized effort would do much to cut down expense and get results from accounting and statistics. The institution of a statistical bureau to govern and set forth standard indexes and ratios would be a benefit to all member companies, and the standardization of records and charts covering the important indexes would do much to control costs.

The organization of the Joint Pole Association was a step in the right direction. This association could remain, or be consolidated with the new organization. A bureau tax department could be organized as applicable to the industry instead of contributing to tax bureaus that apply to all phases of taxation. A legal division, carrying on a service of a general character for federal or state representation at Washington and Sacramento, would be a valuable department. Individual companies find it a burden to maintain such individual representation and expense. The substitution of the Bureau would relieve companies from submitting data on political projective items which are necessary in the conduct of their business. The public relations department would contact all civic clubs and organizations or associations, chambers of commerce, etc. and affiliate with state institutions and universities for the development of electrical research work. The organization of student groups; educational courses for employees, and blanket pension and sick relief, together with an employment bureau or division would come under the welfare department.

Monopoly has always been a ballyhoo with the public, yet for the benefit of the public and the investor in utilities, combined, concentrated and specialized effort is the goal we must seek. Any advantage that politics can gain in showing lack of concentration, duplication of facilities, quantity production or the like, to gain its end will be used against private ownership. The only solution is by the development of an organization that can subdue and defeat it. The increase in rates through political operation and useless experimenting and manipulation will have its effect on the manufacturers of electrical equipment likewise. Only by a harmonious, consolidated, and co-operative affiliation can we hope to uphold this vast business that has been constructed upon individual and private initiative.

The significant factors underlying the creation of such an apparently stupendous co-operative body through the service rendered to utilities, producers, and public alike by its policies and accomplishments is coercive to political propaganda designed to capitalize on the greatest enterprise and fundamental structure for the development of the West.

Business Building Brainstorms + + +

[***What the Industry needs is a brainstorm to destroy the power surplus pest—Arthur Markwart, president, P.C.E.A.***]

Build Load By Catering To Hobby Fad

35 Every man has, or ought to have, a hobby. Nine times out of ten it will run to something mechanical because all men, deep down, are only overgrown boys. They still have a boy's curiosity. They still want to know what makes it go. They still love to see the wheels go round.

Already thousands of men have a little workshop in basement, attic or wood shed and thousands more are figuring on fitting one up any time now in which they can see the shavings peel off, the sawdust fly and watch something grow from a shapeless mass to the finished article right under their own hands.

Many of these hobby workshops contain nothing more than a bench of sorts and a few hand tools and no sort of light worth calling a light. Why not a little campaign on better lighting and better equipment for the hobby workshop?

Lots of hobbyists, with such hobby workshops, are figuring that one day they'll add a few turning tools to their equipment, and a small rip saw and maybe a small lathe and an emery wheel and a polisher or two, and drive the whole works with a small electric motor. They only want an excuse to get started. Why not suggest that excuse yourself?

Try a little advertising (on the whimsical side with the cartoon type of illustration) explaining how many jobs a small motor could do in a hobby workshop and how an electrically-heated glue pot and an electrically-heated soldering iron and anything else you can think of would make his hobby workshop the swellest place ever and the hobbyist would be chief designer, chief engineer and everything else all rolled into one. Not only older men fall for the hobby idea, but the young people are just as keen on it, only they don't always get the encouragement they deserve. Why not encourage them yourself? There must be someone in your organization who has a line on this sort of thing—has a hobby workshop of his own. Have a talk with him—get his ideas—get him to show you his hobby workshop. Then get his ideas on how he would light and equip his workshop—what additional gadgets he would put in that could be driven by a small motor and don't forget the electrically-heated glue pot and soldering iron. Maybe a space heater for taking off the chill might be included in the possible equipment.

Why not make a window display of a hobby shop for a week or so? Don't make it too elaborate, but whatever else you do, have it in action. Better still, fit up a corner of your store or showroom as a hobby workshop and put it in charge of some nut (we're all more or less nuts) who can talk the lingo. Invite people to come in and see it. You ought to sell some additional lighting and some additional power for glue pots, soldering irons, heaters, small motors and what have you. So far as I know, it's virgin territory and it's a whole lot bigger than may appear at first sight. Try it, anyway. It's right at your door.—*T. R. M.*

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An Engineering Approach To Load Building

36 Little thought is given to the subject of voltage regulation as a load builder. The quality of service rendered by a power company is next in importance to the continuity of service. Without both the utility cannot expect to add greatly to its revenues. Good voltage regulation plays a big part in the quality of service.

The public is becoming more and more receptive to the idea of greater electrification of the home, the office, the store, and the factory. Consumers are using in increasing numbers all types of appliances, refrigerators, radios, air conditioning and better lighting, and will continue to do so as long as they can be assured of good voltage for satisfactory operation. A consumer dissatisfied with present service is not in the market for more appliances nor will he use his existing appliances to their fullest extent.

Voltages higher than normal result in increased lamp renewals. Voltages lower than normal result in revenue losses. Both result in dissatisfied consumers. The correction of low voltage will permit of faster heating of resistance type devices and will stimulate the use of ranges, air heaters, water heaters, and other revenue building equipment. It will bring about increased power consumption in lamps. Incandescent lamps are more sensitive to voltage changes than most other devices. The consumption of power increases approximately 1.6 per cent for each per cent increase in voltage.

Some may say that the increased revenue will not warrant the cost of the voltage correction. In some cases perhaps not, but in many the ratio of cost to revenue is small. Voltage regulation can often be corrected by properly adjusting present regulating equipment, by replacing and relocating distribution transformers, by adding copper to primary and secondary circuits, and by adding induction or step-regulations where circuits are unregulated.

Without a doubt the maintenance of normal voltage at all times will increase the revenue by increased power consumption and better public relations.—*E. A. McGinty.*

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Low Wattage Water Heaters Build Load

37 A better daily load factor is one of the most promising methods of lowering rates, and one of the obvious ways to accomplish this is to store energy in the form of heat. Water is an ideal medium being cheap and useful and possessing a good coefficient. Why not then use a low input electric water heater so proportioned as to have practically constant operation throughout the day and night?

Assuming 160-deg. water, the requirements of a small family of two to four persons might be as follows: 3 gal. for dish washing three times a day, 10 gal. after breakfast for the washing machine, and 6 gal. in the morning, 2 at noon and 20 at night for bathing. A heater with a recovery rate of 2 gal. per hour and a capacity of 30 gal. will care for this demand. Some waste will occur in heating piping, but offsetting this in amount will be the cold water added for dilution.

HEATER LOG

Time	Hot Water Available Gal.	Amt. Gal.	Use
7:00 AM	30	6	Bathing
8:00 AM	26	3	Dish Washing
9:00 AM	25	10	Washing Machine
12:00 Noon	21	2	Bathing
1:00 PM	21	3	Dish Washing
6:00 PM	28	2	Bathing
7:00 PM	28	3	Dish Washing
8:30 PM	28	8	Child's Bath
10:30 PM	24	10	Shower
6:30 AM	30	Current off	
		47	Total

As long as the average daily load does not exceed 48 gal. and immediate demands are kept less than 25 gal., no heater could give better service. The combination of generous capacity and small input means that the heating elements will be busy in the off hours, a distinct advantage all around.

To prevent wasteage of heat down the drain which always occurs with a high rate of flow, an orifice should be installed, preferably at each spigot, to restrict this flow to 2 or 2½ gal. per min.

As to the cost of operation, 2 gal. of water per hour raised 100 deg. F. in temperature in an insulated tank requires nearly 0.5 kw.hr. The rating of this heater would be 500 watts, a most modest load easily furnished at 110 volts thus escaping the usual bugaboo of costly wiring and 220-volt service. An average usage of 20 hours per day means 300 kw.hr. per month.

This is a generous addition to an average monthly consumption of 60 kw.-hr., and inasmuch as it is of the trickle variety, the price can be made very attractive. In fact it might be found that a flat rate of $2.25 per month for such a connected heater would be ample. It should be possible for the utility to purchase and install these heaters for not over $50; an interest charge of 25 cents per month being sufficient. The probable life of 10 gage copper bearing galvanized steel tanks would be 8 to 10 years which means the cost can be written off at 50 cents per month. Hence the heater can be either sold outright and billed at $2.25 per month or rented at $3.00 a month.

To accomodate the greater demand of larger families there could be offered a 750-watt, 45-gal., 72-gal. per day unit at $4.50 per month. If still greater capacity is needed, two heaters of either or both sizes could be installed in parallel.

It seems most likely that people would be willing to pay these definite figures in view of the cleanliness, silence and reliability of the service, and if any considerable number of consumers did so act, the effect on the load curve and revenue should be most salutary.—*Arthur K. Ingraham.*

Prizes aggregating $50 will be awarded for the best business building ideas to dispose of the industry's power surplus published in *Electrical West* during the six months, May to October, inclusive. Prizes will be awarded by the Northwest Electric Light & Power Assn. and its officers, together with the editor, will act as contest judges. Business-building merit, practicability of application and originality will be the basis of judging and the opinion of the judges will be final in awarding $25 for the best idea submitted, $15 for the next best and $10 for the third best.

In addition *Electrical West* will pay $2.50 for each idea considered worthy of publication by the editors. Suggestions preferably should be limited to 400 words or less, may be published under a nom de plume and should be sent to the editor.

Cooperation on Parade + + +

[*Forecast of forthcoming cooperative merchandizing activities, and review of activities in progress or completed, a summary of cooperation at work throughout the West*]

Salesmen Winners Take Boat Trip to Fair

AS THE grand finale of a highly successful twelve week's refrigerator sales campaign in southern and central California, 285 refrigerator salesmen, dealers, distributors and Southern California Edison Co. men were guests of the Edison company July 5, 6 and 7 on a cruise on the S.S. Emma Alexander and a visit to the California Pacific International Exposition at San Diego. H. C. Rice, manager of the Edison merchandise department was the "skipper," aided by members of his department office and field staff.

Salesmen making the trip were prize winners of the eleven Edison divisions who sold thirty or more units each during the campaign. In addition to the reward cash prizes aggregating $2,400 were awarded.

The results of the campaign, according to Mr. Rice, were extremely gratifying. Approximately 12,000 units were sold during the campaign, an increase of 100 per cent over the corresponding period of last year.

Inaugurated on April 1 with a smashing advertising program the campaign was carried on with unflagging enthusiasm throughout the twelve weeks. A series of Monday night dealer-salesmen dinner meetings was one of the stimulating features of the continued sales drive, with inspiring sales and cheer speeches, skits and progress reports being broadcast over the Edison private telephone system to twelve meetings simultaneously from Edison headquarters in Los Angeles.

Dealer and distributor co-operation throughout the Edison territory was outstanding as a campaign feature. Dealers and distributors, in addition to keeping their men on the firing lines at a high point of endeavor, tied in with Edison advertising in the daily and weekly newspapers. Solid pages and double trucks of refrigerator advertising appeared frequently over the entire territory. The company's advertising department reinforced its newspaper advertising program with a well designed campaign of display material for the use of dealers, outdoor advertising, bill stickers, counter cards and radio spot announcements that blanketed the territory at frequent intervals. The department likewise utilized its Electrical Times, a consumer magazine reaching 360,000 homes, to spread the story of electrical refrigeration.

The trip to the fair was formally designated as the Edison Refrigerator Cruise, but there was not much formality further than that. Fine good fellowship even rousing hilarity, was the keynote of the cruise.

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Merchants Pool Accounts to Form Finance Firm

A COLLECTION system inaugurated cooperatively by a number of merchants, doctors and a collection company is working satisfactorily for a number of electrical firms in Watsonville, Calif. It has been in operation about 6 months and is bringing a fine response and a collection of old bills.

The plan operates on the principle that the various creditors for a person owing bills are grouped together under a central loan which is paid off in 12 or 18 equal monthly payments. In this manner the merchant receives his money at once. A finance form is mailed to the delinquent accounts telling them that the financing firm, Peacock Financing & Adjustment Co., is in a position to finance their claim and asking them either to get in touch with the office or to have one of the representatives call. If no response is made personal calls are made.

Under this plan, according to Mr. Peacock, the collection department has improved about 100 per cent. Merchants are also turning their accounts in much faster and are turning in better accounts. A charge of 25 per cent commission on accounts is made at the end of the year after overhead is taken out. Participating merchants are returned one-half of the profits. This makes collecting cheaper than could be done under any other plan and the merchants are enthusiastic about it.

The company was organized among the merchants and doctors who allowed it to keep a portion of the collections derived from the delinquent accounts to be placed in the financing fund. This is loaned to debtors, with the proper security of co-signers or chattel mortgages or automobiles, with which to pay their accounts.

It is contemplated that the plan will also be inaugurated in Fresno and other California cities in the near future.

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• SIERRA PACIFIC POWER CO. added "Light Up" to the usual slogan "Clean Up-Paint Up" in recent advertisements.

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Demonstrators Add Sales Punch

When a battery of women demonstrated several makes of ironers in the lobby entrance at Hink's Department Store in Berkeley that store's "Home Appliance Festival" came right out into the street for attention. And the attention it received aplenty. During the festival the Electric Appliance Society of Northern California was represented by Gladys Byrne, educational director. Julian Carash, appliance department manager, spotted refrigerators, vacuum cleaners, washers and ironers almost everywhere in the store

Free Range Wiring Offer Sells 2291 Ranges in Portland

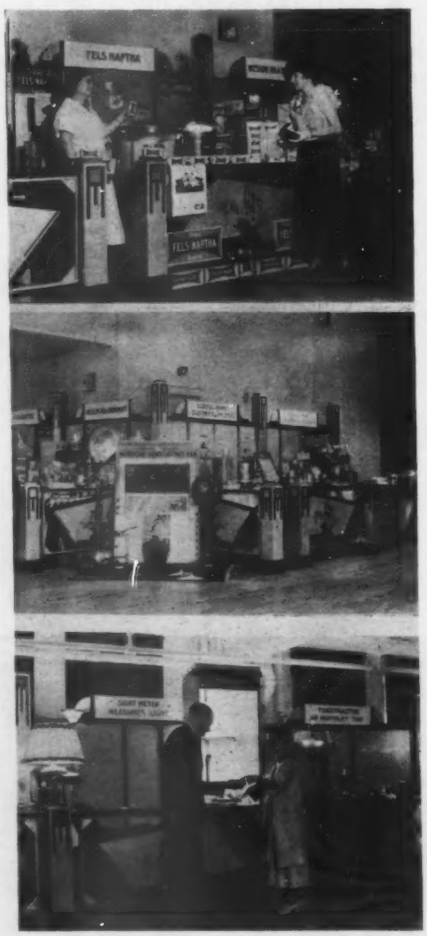
PORTLAND'S cooperative electric range campaign with free range wiring as an inducement which sold 2,291 ranges between March 18 and June 29 was so successful that it was extended until July 31. Sponsored by the Northwestern Electric Co. and the Portland General Electric Co., the drive was the most productive load-building activity that was ever undertaken by the industry in this territory. Dealers and contractors who were asked what the campaign meant to them in new business were enthusiastic as indicated in the following interviews:

FURNITURE STORE — Vic Johnson, manager range and refrigeration department, Edwards Furniture Co. "Our business for the first quarter of this year was 4000 per cent greater than it was for the corresponding time last year. Since the campaign started, we have sold three times as many electric ranges as we did in the same period last year. It has helped the other lines also. Last week we noticed four deals for refrigerators that were started as the result of range sales, in addition to general store inquiries. The argument is: 'take the money you save on wiring and get started on some other electrical appliance.' We naturally are for the campaign 100 per cent."

DEPARTMENT STORE—C. E. Walbert, stove and refrigerator department, Meier & Frank Co. "To my mind, free wiring on the part of the electric utility is the only way for it to compete successfully with other cooking methods. Free wiring has been needed a long time to give the electric utility an even break. I think it should be continued as a definite policy. The Mountain States Co. has been doing it for five years, and all results are to the good. It could be continued here in Portland after the campaign, even if the public has been told that the campaign is for a limited period. Go right on from there without a break. The public will not criticize because the public is the beneficiary."

ELECTRICAL CONTRACTOR AND DEALER. C. Y. Bressie, Bressie Electric Co. "The campaign has been a tremendous trade stimulator. While I have no license to tell utilities what they should do, I should be permitted to have a merchandising brainstorm, which is this: The electric utility might find it a paying investment in the end to go even farther than the free range wiring incident to a range sale. They might well go up one street and down another and spot every house without range wiring and go in ready for a new electric range, whether it was sold at the time or not. That would be readiness to serve from another angle, and I am fairly serious when I say that it would pay in the end."

ELECTRICAL DEALER—S. J. McCormick, S. J. McCormick Co. "We have had a very appreciable gain in electric range sales since this campaign began. Further, we feel confident that it has sitmulated the sale of household appli- free of charge and wire each one up



When Meier & Frank Co., Portland department store, staged an electrical exposition, a real exposition it was. All booths were of a standard modernistic design of silver, black and scarlet. Overhead arches were eliminated so as to provide unobstructed view. A typical example of the booth arrangement is shown in the center photograph. The upper photograph shows the tie-in between the washing machine and a soap product. The bottom photo shows the power company's exhibit featuring sight meter demonstration

ances of all kinds. It is a step in the right direction."

CONTRACTORS' OPINIONS

The effect on the contracting group has not been exactly the same as in the dealer field. While there is no feeling against the campaign, all the contractors are not participating. In fact, comparatively few seem to be doing the bulk of the work. Perhaps the situation is best set forth by J. R. Tomlinson, secretary Portland Chapter, National Electrical Contractors Assn., who says:

"There is no doubt that the free wiring campaign is bringing thousands dollars of business to Portland contractors, and is therefore to be commended. That all the recognized contractors are not participating is due merely to the price that has been set. It has been placed at a point where some can see a profit and some cannot. Naturally the utilities must figure closely for they are the ones who are standing the expense.

"Several conferences were held between the utilities and contractors regarding price. After a lot of figuring, the association contractors felt that the price would have to be $26.75 per installation to show a profit. But the outcome was that the utilities set $23.00 as the most they could pay. It is not strange, therefore, to find a comparatively few contractors doing the work. I understand that the bulk of it is going to Ace Electric Co., Dimitre Electric Co., W. R. Grasle Co., Morrison Electric Co. and Tice Electric Co. As far as I know, any reputable contractor who felt that he could make some money at the rate would have an opportunity to try. As a contractor, I think the movement is a good thing, and wish that the utilities could make free range wiring a permanent policy on this or some other basis that would enable the contractor to do the work. It represents real coordination of effort on the part of three branches of the industry."

The feeling of the contractors who are not participating is perhaps well expressed by Mrs. E. W. Pierce, of Pierce-Mowrey, Inc. "We are not doing any of the wiring for the utilities in this campaign. But it is for the sole reason that the price set upon is not sufficient for us to make a profit. Otherwise, I see no reason why we should not be doing our share of it, for it would be merely a matter of selling our services to the utilities, and any established contractor of good reputation who tried would no doubt be given consideration on a basis of fairness."

An angle on profit-at-the-price is indicated by W. R. Grasle of the W. R. Grasle Co., one of the participating contractors. Ordinarily they specialize on larger work of the character of industrial and commercial buildings, schools,

etc. Mr. Grasle says: "Under the usual conditions, we could not go after this range wiring business. But under the present set-up we can at the $23 price, even. It is because here we are dealing with one party only, the utility. Our overhead is not increased and there is no sales expense in connection with it. Also, there is no estimating, figuring costs, and no designing connected with it. The call comes in, and the crew going out under adequate supervision does the work and that is all there is to it. So we can make a small profit here in a class of work that we could not attempt if we had to deal with the individual owner."

From the utility's standpoint, A. C. McMicken, general sales manager of Portland General Electric Co., had the following to say:

"Although there are a great many homes in the territory we serve wired for electric ranges, the dealers have for a long time complained of the handicap of selling a range wiring job in addition to selling the electric range itself. As an experiment the Northwestern Electric Co. and our own company agreed to offer free range wiring for a 10 weeks' period to see if with a range saturation approximating 25 per cent free wiring would be a material aid in selling new ranges and in getting back into service ranges in the hands of owners but out of service because, due to the depression, they had moved into houses not wired for ranges.

"At the end of the 10 weeks' period our company had provided 956 free wiring installations and had also added to its lines between 250 and 300 ranges which did not require wiring. Of the 956 wiring jobs actually installed, 39.4 per cent were installed to take care of dealer sales; 36.2 per cent to take care of our own sales; and 24.4 per cent were installed to put into service owners' ranges previously out of service. This activity was so successful that it has been continued and at the end of 12 weeks the figures are as follows:

"Total number of free wiring installations actually made, 1,135. Of this number 440 were made to take care of dealer sales (38.8 per cent); 407, or 35.8 per cent, were made to take care of our own sales; and 288, or 25.4 per cent, to take care of reinstallation of customer owned ranges. In addition approximately 506 ranges have been installed which required no wiring, making the total increase of 1,641 in ranges added to our lines for the 12 weeks' period beginning March 18.

"This is considerably more ranges than were added to our lines by our own and dealer sales for the entire year of 1934. This, we believe, indicates very plainly that electric range wiring is a handicap and a detriment to the sale of electric ranges. We intend to continue offering free wiring, at least until the end of June. We feel that the advertising and publicity campaign accompanying the activity prepared by our advertising counsel, Gerber & Crossley, has been very effective and we are exceedingly pleased with the fine support and cooperation we have had from all dealers selling electric ranges."

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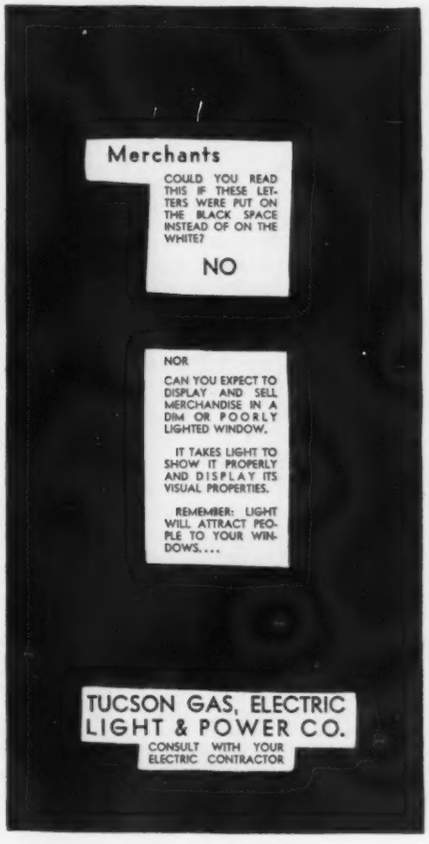
Contrast Ad Dramatizes Need for Lighting

By dramatizing the need for modern window illumination through striking, black and white newspaper advertisements and through personal work with display managers, the Tucson Gas, Electric Light and Power Co., Tucson, Arizona, has increased its window display load about 15%.

One of the most striking newspaper ads ever used in Tucson played an important part in this campaign, originated and developed by A. R. Seaman, the company's advertising and display manager. The entire ad was a solid black, except for three irregularly shaped white spaces in the center.

Facsimile of one of the advertisements used to stress the need for good illumination


Merchants
COULD YOU READ THIS IF THESE LETTERS WERE PUT ON THE BLACK SPACE INSTEAD OF ON THE WHITE?
NO
NOR
CAN YOU EXPECT TO DISPLAY AND SELL MERCHANDISE IN A DIM OR POORLY LIGHTED WINDOW.
IT TAKES LIGHT TO SHOW IT PROPERLY AND DISPLAY ITS VISUAL PROPERTIES.
REMEMBER: LIGHT WILL ATTRACT PEOPLE TO YOUR WINDOWS....
TUCSON GAS, ELECTRIC LIGHT & POWER CO.
CONSULT WITH YOUR ELECTRIC CONTRACTOR

Seaman followed them up by contacting display managers of all leading local stores and consulting with them on their lighting problems, both window and interior. In several cases, he personally designed special window backgrounds which would help reflect light and produce a better effect. In one department store, he showed the display manager how to improve appearance in three departments by lighting up unused pillars and building display shelves around them. The whole idea was to make display men "illumination conscious".

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Market Week Will Include Appliance Show

A radio and appliance show will form the "third market" in the Fall Market Week of the Western Furniture Exchange at the Furniture Exchange Building, San Francisco, during the week of Aug. 5 to 10. Furniture and home furnishings buyers from all parts of the West will attend the market for a viewing of new lines of merchandise and to attend the meetings held in conjunction with the Market Week.

Since last year the number of electrical lines exhibited at the Exchange has been nationally increased. General Electric Supply Corp., Leo. J. Meyberg Co., H. R. Basford Co., Apex Rotarex Manufacturing Co., Chanslor & Lyon Co., Incandescent Supply Co. and a number of other exhibitors of electrical appliances and home wares will show new lines to the visiting buyers.

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• RANGES AND REFRIGERATORS are holding "the center of the stage" in the activities of the Electrical Equipment Sales Assn. in the territory of the Idaho Power Co., during this part of the year. A number of electrical shows, featuring both the range and refrigerator, are being held in various towns in the system. Increased attendance to these shows over last year indicates greater interest. Refrigerator sales are up 40 per cent in Idaho over the same period last year, according to L. W. Brainard, general secretary of the E.E.S.A.

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• FREE TRIALS of air conditioning are being offered customers of the Central Arizona Light & Power Co. in cooperation with the Home Insulation & Air Conditioning Co., of Phoenix. A portable self-contained unit is offered for a 48-hour free trial in any home.

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• FISHER-GLASSFORD CO., one of Fresno's pioneer hardware and appliance supply firms, has installed a new electric appliance department featuring a number of electrical lines.

Ironing Schools Stimulate Sales for Dealers

Ironing schools conducted in dealers' stores have been found to be successful in securing prospects and creating customer interest in this appliance, according to Miss Gladys Byrne, educational director of the Electric Appliance Society of Northern California. A series of such schools have been organized by Miss Byrne.

Typical of the programs was that of the school staged at Breuner's in Sacramento recently with the assistance of F. E. George and Miss Eva Wise of that organization. In a demonstration Mr. George ironed a shirt on the stage in 4½ minutes. Miss Byrne gave a lecture on the value of the electric ironer emphasizing that it saves labor, money, time and preserves health. Miss Wise gave a demonstration with intricate pieces of clothing during which she brought out various sales points.

To stimulate attendance a door prize was awarded and tea was served. In addition every woman who sat down and used the ironer was presented with a gift. The first school attracted 68 housewives and attendance reached a peak of 101.

Women show interest in ironers at school conducted at Breuner's in Sacramento

These schools are becoming increasingly popular with dealers throughout northern California and dealers report many sales closed as a result of them. Miss Byrne is starting the promotion of ironing schools in every store that is adaptable to them.

DEALERS SALES REPORTS—MAY-JUNE, 1935

A Summary of the Dealer Reports Compiled by Associations, Societies, or Bureaus, or Dealer Contact Departments of Utilities

APPLIANCE	P. G. & E. Co.[1]		San Diego Cons. G. & E. Co.[2]		San Joaquin Lt. & P. Corp.[3]		So. Calif. Edison Co., Ltd.[4]		Utah Power & Lt. Co.[5]		Wash. Water Power Co.[6]		Idaho Power Co.[7]	
	*May 1935	6 Mos. Dec.-May	June 1935	Year to date	June 1935	Year to date	June 1935	Year to date	June 1935	Year to date	*May 1935	Year to date	June 1935	Year to date
Ranges	307	1,333	24	135	132	809	476	2,862	210	1,055	42	193	28	326
Water Heaters	255	1,086	36	223	52	375	269	1,644	84	224	12	79	.....	.....
Air Heaters—aux.	106	3,094	14	519	.....	52	33	590	5	110	57	275	1	6
Air Heaters, 220	34	408	.....	.....	22	314	.....	.....	.....	.....	.....	.....	.....	.....
Refrigerators	5,227	15,041	689	2,259	1,371	4,179	4,433	16,171	1,572	4,346	808	2,502	101	1,330
Dishwashers	9	40	.....	.....	1	11	.....	.....	1	2	.....	.....	.....	.....
Washers	2,798	13,138	285	2,344	402	1,863	2,137	13,365	712	4,395	392	1,749	29	363
Ironers	827	3,886	39	219	79	318	344	1,979	40	209	36	157	4	26
Vac. Cleaners	2,190	11,026	115	705	52	466	727	4,913	457	2,248	161	878	2	43
Radios	4,292	33,284	674	4,548	368	3,434	3,107	22,055	514	4,293	492	3,043	6	159
Mixers	680	2,130	40	346	82	473	439	1,972	167	1,201	93	384	2	80
Cookers, Caseroles	.....	.....	18	100	24	100	62	255	91	131	233	970	.....	3
Irons	.....	.....	279	1,420	399	1,863	1,265	7,249	1,255	4,832	453	2,033	25	394
Waffle Irons	.....	.....	113	755	88	589	360	2,259	219	1,167	135	656	2	116
Toasters	.....	.....	161	1,062	124	680	475	3,183	382	1,146	363	1,804	5	155
Table Stoves, etc.	.....	.....	27	265	165	677	233	1,450	725	2,110	.....	.....	4	276
Heating Pads	.....	.....	27	369	.....	.....	70	1,102	45	672	95	451	1	12
Curling Irons	.....	.....	.....	.....	.....	.....	49	368	134	1,192	.....	.....	.....	.....
Coffee Makers	.....	.....	126	673	100	552	334	1,933	185	924	342	1,343	4	163
Sewing Machines	1,224	7,035	21	100	.....	.....	.....	.....	.....	.....	73	351	.....	.....
Clocks	.....	.....	.....	.....	80	523	307	2,104	259	1,067	332	1,202	.....	32
Fans	.....	.....	.....	.....	.....	.....	437	799	450	507	24	54	4	157
Floor Polishers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sun Lamps	.....	.....	.....	.....	.....	14	14	166	1	42	1	19	.....	4
Reflector Lamps	.....	.....	.....	.....	79	513	.....	.....	389	4,541	141	383	8	120
Misc. Lamps	.....	.....	.....	.....	.....	.....	.....	.....	949	4,639	1,422	5,987	20	492
Yard Lights	.....	.....	.....	.....	72	269	.....	.....	.....	.....	.....	.....	.....	.....
Misc. Small Appl.	.....	.....	189	1,322	337	1,022	367	2,567	3	106	.....	.....	.....	.....
Total Dealers	.....	1,400	.....	.....	.....	.....	562	562	.....	.....	.....	.....	.....	.....
No. Reporting	.....	.....	.....	.....	142	127†	490	513†	.....	.....	.....	.....	.....	.....

* June Report was not available at time of going to press. † Arithmetical average number of dealers reporting since first of the year.

[1] P. G. and E. reports obtained only on major appliances upon which accurate reports are available from dealers' accounts. Ranges, water heaters, and air heaters include company and dealer sales. Total dealers include gas as well as electric dealers. First report of year 1935 starts with Dec., 1934, and will be cumulative from that month.

[2] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Clocks, fans included under miscellaneous.

[3] Includes dealer reports from Midland Counties Public Service Corp. territory also. Compiled by Valley Electrical Supply Co.

[4] Includes reports from dealers on San Joaquin Valley system of the company as well as Southern California areas served. Comparative figures of same month last year indicates improvement.

[5] Includes Utah Power & Light Co. territory in Utah, Idaho and Wyoming. Also Western Colorado Power Co. territory. Dollar value of appliance sales in June, 1935, is over 300,000 ahead of sales in June, 1934.

[6] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.

[7] Figures compiled by Electrical Equipment Sales Association.

+ + + by Electra's Husband

This Is the Abundant Life

"I DON'T think I like the government messing around with my private affairs," Electra said to me in one of her more pensive moods the other night. This was a decided change for her, since she had stubbornly supported the Brain Trusters ever since that memorable March morning in 1933. Privately I think she does it just for the sake of arguing. So I pressed her for a reason.

"Well you see I've been reading about what might happen," she said reluctantly. "Aunt Sally sent me some newspaper clippings and I'm beginning to wonder."

"About what?" I parried, expecting another "far into the night" argument. She handed me a clipping which so tickled my risibility that I must pass it on to my dear readers (if any). The editor of the Apopka (Florida) *Orange County Chief*, if he wrote the item, is an imaginative cuss. He called it "The Sad Case of Sam Rayburn and Burt Wheeler vs. Jennie Fernberg, a Femme Sole, as of January 4, 1939." Here it is:

"Miss Jennie Fernberg, our vivacious young school teacher, is—and has been for quite a spell—having her first experience with the Reyburn-Wheeler bill.

"Four years ago Jennie decided to help prime the pump by building herself a four-room bungalow on the outskirts of town. Three days before she moved in she notified the electric light company—as was her custom when she changed her domicile—that she was ready for electric service at her new home.

"Thereupon the electric light company filled out Federal Power Commission Form U. S. 9873, Federal Trade Commission Form U. S. 13922 and Securities and Exchange Commission Form U. S. 42827, and forwarded same to Washington. Ten duplicate copies of each form were, in accordance with Federal regulations, forwarded to the PWA the FERA, the ERB, the ERA, the FHA and the HOLC.

"The forms showed that it was estimated to cost $68.72 to connect Jennie's new house to the electric service lines and each form, as required by Federal regulations, was accompanied by a complete file of the company's residence electric rates, its commercial electric rates, its lighting rates, its small power rates and its wholesale power rates, together with detailed specifications for the pole, the wire, the meter and the other items of material.

"All this took place on April 1, 1936, although Jennie insists that the date is not significant. Nothing further was heard until June 17 of the same year, when Jennie's electric light company received Federal Power Commission Form U. S. 76248, advising that the matter had been referred to the Commission's Planning Division.

"Promptly thereafter, to wit, two months and three days later, the Planning Division advised the electric company that it could not approve a 35-foot pole to carry the service wire to Jennie's house and that it had recommended to the SEC that the company be required to use a 30-foot pole and also reduce its estimate of the costs of the extension from $68.72 to $66.38.

"The electric company replied that a 35-foot pole was necessary in order that its wires might clear a crabapple tree in Jennie's front yard, and requested approval of its original estimate.

"On October 12, 1936, Jennie purchased seven lamps and a supply of kerosene. On the same date she advised Washington that she would herself, pay the extra $2.34 required to install the 35-foot pole. On October 27 she was threatened by the Department of Justice with dire consequences if she again attempted to bribe the servants of the people.

"In November 26 (still 1936) the Securities and Exchange Commission's Division of Contracts and Documents advised that it had referred the company's original application to the Federal Trade Commission to determine whether Jennie's electric company came within that Commission's recommendations as to type and size of geographically and economically integrated public utility companies' called for in the Wheeler-Rayburn Bill.

"On June 13, 1937, the Federal Trade Commission, advised the company that it was sending an engineer and an accountant from Washington to study Jennie's situation and submit a report.

"On the evening of August 17th, 1937, the Washington engineer and accountant arrived at Jennie's home and formally presented their credentials (Form U. S. 648, 249). They expressed considerable surprise upon learning that Jennie was using kerosene lamps in this modern age and left with her form U. S. 97234 entitled, 'The Fuller Life.'

"On November 12, 1937 the Public Works Administration advised the electric company that its Division of Economics had reported to its Division of Engineering which had reported to its Division of Finance, which had advised its Division of Rates, which in turn had reported to its Board of Review, that, in its opinion, the wholesale power rates of the electric company were too high; that it could not approve its applications and would proceed at once to have its Crystal-Gazing Division study feasibility of installing a Government owned power plant in Jennie's town.

"The electric company immediately replied that it wasn't wholesale power that Jennie wanted but only a little electricity to use in her bungalow. On January 17 (we are now in 1938) the PWA replied that under Regulation U. S. 874,253, the company's intention was ipso facto.

"On April 24, 1938, the electric company forwarded Federal Power Commission Form U. S. 82786, revising the estimate that it had submitted two years earlier. The company's new application pointed out that Jennie's crabapple tree had grown quite a lot in the meantime; that a 40-foot pole would now be necessary. The new estimate of cost was $71.27.

"On Christmas Day, 1938, a document was received by the company advising that the FPC, the FTC, the SEC, the TIV, the PWA the National Power Policy Committee and the Water Resources Board had decided to hold a joint hearing in re Electric Service—Jennie Fernberg, and on December 28, 1938, both Jennie and the electric company were subpoenaed to appear in Washington, with counsel, on April 8, 1939, to show cause why the CCC should not remove Jennie's crabapple tree. There the matter rests."

●

"FLASH—Jan. 3, 1939—Miss Jennie Fernberg announces that she has shot the Federal Trade Commission's economist, chopped down her tree, burned her bungalow, and is leaving for Washington 'on a business trip'."

I think Electra would too.

Competitive Rates Will Encourage Off-Peak Use

By A. R. HAVENER
Serviceman, Southern Sierras Power Co., Searles Lake, Calif.

WITH the great increase in generating capacity throughout the country in the past few years, and with very large blocks of hydro power soon to be disposed of, our problem is not the cost of obtaining power, but getting it to the consumer with a minimum outlay for new equipment. Therefore, in a consideration of this problem, we will presuppose that power can be obtained on the board at a very low figure, or appreciably lower than at the present time.

The solution of this problem will require a careful study and correction of regulation and redistribution of our present load to obtain additional capacity, or where this cannot be done, the securing of additional load which will fit the existing conditions. To accomplish this in some cases, we must be prepared to offer special inducements. We can well afford to do this provided we can carry additional load without additional capacity. Special meters must be installed which can be set to record separately consumption for any part of the 24 hours. This will be more or less in line with the present practice of demand meter installation. Incidentaly, only about 7 per cent of the total distribution cost is invested in consumers metering, with a total of 77½ per cent absorbed by poles and fixtures, overhead conductors and distribution transformers. Therefore, we must avoid, if possible, loads which will require more feeder or transformer capacity and concentrate on those which will utilize our present capacity here. Securing load to fit our conditions will, in nearly every case, necessitate meeting very stiff competition. In any case we must not make it impossible to use equipment at any time during the 24 hours but rather create the desire to use more power in off-peak periods.

Rural Possibilities

Let us first consider the rural loads, including a few small towns and consisting principally of pumping load, lighting, and some heating, mostly electric ranges. Here we must find some load which will replace the pumping load in the winter months. Keeping in mind that no increase in capacity will be needed, could we not sell air and water heating to these pumping customers at a price which would compete very favorably with any other type of fuel? The time is past when the farmer can go out and cut wood for fuel. He must now buy fuel of some sort and prices on all types of fuel are steadily increasing. Therefore, why not electricity? This is the ideal load from an operating standpoint and would be heaviest in months when the pumping load is at a minimum.

In the summer months when the pumping load is heaviest, with a comparatively small outlay for special metering equipment, we could offer special rates on off-peak pumping, thus obtaining extra capacity for cooking, air conditioning and refrigeration, loads which can not be regulated. This pumping could just as efficiently be done at night as in the daytime, but since there is no advantage to the consumer in so doing, naturally it will be done during the day unless we do offer special rates. Of course this would not pay unless we could obtain additional load to replace that so shifted, since we already have sufficient capacity to carry the existing load, as is.

System Loading
Third prize answer to the problem: "From the Operating Standpoint What Types and How Much Additional Load Can Be Added to Existing Electrical Facilities?"

In the industrial districts perhaps the greatest load can be added to the present facilities. From the typical load curves in this district we can see that from 5 p.m. to 7:30 a.m. the load factor is only about 10 per cent of the peak load. Thus any load added here which would come on in this period would require at most, only a slight extension of existing secondaries, or in the case of a large consumer an additional bank of transformers. Baking plants are a type of business which could be added here as most of their baking is done in this off-peak period. Ice plants can also run to advantage in the cooler temperature of these off-peak hours.

With the proper incentive in the way of special rates a good many of the large power users could be persuaded to run at night in addition to their regular schedule. This would not only be additional load but would require no additional facilities with the exception of special meters.

Power Factor Bonus

More attention should be given to the power factor of our customers installation. Some means should be devised to encourage him to install capacitators, or where the load is favorable, synchronous motors. This could be done by selling him on this practice, or possibly offering a bonus to consumers having a high power-factor. Selling the customer on high power-factor should not be too difficult. As an example the average power customer's load consists of a number of small motors, some of them carrying full load all the time, but in all probability the loads on the greater part of them are intermittent or possibly to save installing a new motor one or two of them may be carrying only 50 per cent full load. It is doubtful if the power-factor here would exceed 75 per cent. A check would show this consumer just what his power-factor is, and a very close estimate could be given him as to just what he could expect to save in a year's time on his power bill by a specific investment. By having a saving brought to their attention in dollars and cents, there are few power users who would not be interested. This sort of regulation would increase the capacity of existing facilities to a great extent and incidently cut our cost of regulation.

Another plan along this same line might be that the power company install these capacitators or if it proved more practicable, automatic tap-changing transformers. This would entail considerable expense, but would no doubt be cheaper than increasing capacity all along the line.

Consider next the metropolitan area having a very high peak at 7 to 8 p.m. and a very low valley in the early

morning hours, with fairly steady load throughout the day. These peaks cannot be shifted to any great extent as most of this load consists of lighting and small power. Our problem here is to find new load which will absorb the excess capacity required for the high peak. Air-conditioning of offices and business houses would be a desirable load here since it would be practically entirely off before the heavy lighting load at 7 o'clock. Off-peak water heating could be used here, and there should be considerable demand for such service in this area. More electric cooking could be sold in cafes, load of this type will come on earlier in the morning and will tend to smooth out the valleys during the noon hours and at 6:00 p.m. To sell this service we must meet competition. I believe we can, since we already have enough capacity to carry a peak load 25 per cent higher than the normal load throughout the day. In this type of congested area one large transformer may feed a large number of consumers. Thus off-peak load here would probably only necessitate increased service capacity.

In this area having mainly lighting load, regulation must be maintained within reasonably close limits. Tap-changing transformers could be used here to provide proper voltage for the very high peak load. Of course voltage must be changed in sufficiently small steps to eliminate light flicker. Additional induction regulators in strategic points might prove more feasible.

In the residential section of the metropolitan area we again find load which can not be shifted. A peak here at 6:00 p.m. 130 per cent higher than at any other time indicates that most of this load is lighting. Here again new load must be found. Increased small appliance use throughout the day will help smooth out this load curve. More electric cooking can be added without increasing the peak to any great extent as most of this will be done before 6:00 p.m. Off-peak water heating is the ideal load here, as there is very little load between 11:00 p.m. and 6:00 a.m. allowing ample time to heat a large amount of water with minimum capacity of heater. The same applies here as to regulation as in the business section of this area. In this case, due to the excessively high peak, more capacity will be needed to give the same per cent of regulation.

The question now arises as to how much excess capacity will be made available in this way. In the case of the industrial area, 80 per cent additional load could be carried during 16 of the 24 hours. Of course, we must be assured that this load will come on during off-peak hours. Special rates will take care of this in most cases, other load will come on normally in this period. Also, checks can be made from month to month on meter readings to prevent overloading. I believe an increase of 10 per cent in power-factor could be made in this area. This, of course, would give us a proportional increase in capacity.

In the business district 25 per cent more capacity is available for twenty hours per day and 50 per cent more for eight hours per day. It would probably be possible to increase peak capacity 5 to 10 per cent by increased regulating capacity.

The residential area offers the greatest opportunity for increased capacity but at the same time is limited as to loads available which will not run over into the peak period. Sixty per cent capacity is available here for eighteen hours per day and 70 per cent more for twelve hours per day. In the rural area we have a slightly different setup in that any load added during six or seven months of the year will not require increased capacity. We find here that less than 50 per cent summer peak-load is being carried at any time during these months, also over 90 per cent more load can be carried for thirteen hours per day, while in the summer months 80 per cent more load can be carried for eleven hours per day. Thus we can see, extra capacity in large amounts is available in nearly every part of the system. Also, the potential load is there in most cases, and I repeat, to secure this load we must meet competition.

Mr. Havener Says

With customer requirements which will consume more electricity and with systems which work less than 50 per cent of the time, the industry must devise competitive rate schedules which will encourage more balanced loading of existing lines. Surplus capacity and potential load warrant research and experiment.

Good Planning An Aid to Good Regulation

By V. E. LEACH
Southern California Edison Company, Ltd.

THIS discussion will apply to the second half of the problem and assumes that good regulation is necessary. It may be possible to obtain better regulation at the same cost or the present standard at lower cost, by the use of different equipment or by different use of present equipment. This ties in closely with the more general problem of distribution economy.

Constant voltage at each customer's individual lamp, regardless of what other load he or someone else may put on is, of course, the ideal condition. If he is at the far (or "near") end of the distribution feeder, and is fed from a separate transformer, his voltage will vary much during the day unless he takes additional load corresponding to the average of what everyone on the line is taking. There is too much to expect of him and he either is not very cranky, or the kind of service he gets is good enough for anyone. The latter assumption gives more latitude for saving. If a secondary network is used the above is modified, but there is always one (not necessarily the same one) who gets the worst end of it.

Standard System

The radial type of distribution system given in the problem paper may be considered the average. A secondary network in the concentrated load sections would be an important factor in regulation, as would any modification of the radial system.

Present systems are built up of transmission lines and substations stepping down to, say, 4 kv. with several regulated feeders, on each of which is a so-called load center where, or at other points, the feeder may branch into several parts. The standard practice is to somewhat over-regulate to this load center and then put in enough copper to prevent undue drop to the farthest consumer.

Under the best of conditions the above system cannot work out to give ideal voltage to each person. If the conductors and paths could be arranged so as to make the same drop from the

substation to each distribution transformer, they could only give the same voltage if all parts were carrying their correct proportion of the total load.

Regulation of each transformer would accomplish this result. Will it ever be done? Let us see how much we could afford to pay for this. A 100-amp., 4-kv. (700-kva. line capacity) regulator costs installed about $3,000 with a small allowance for building. Allowing 50 per cent more in distribution transformer capacity, this would serve 1,050 kva. or 105 transformers if they are 10-kva. size, or 42 transformers of 25-kva. size. This is $28.50 for the first size and $71.50 for the larger, that could be allowed for making them self-regulated. However, with this equipment copper in both primary and secondary could be reduced and some saving in routing could perhaps be effected. This would vary greatly in different locations but the figures can be raised to $35 and $80 as a very rough minimum. These are 30 per cent to 40 per cent of the cost of the transformer.

Can the manufacturers develop small tap-changing or other self-regulating transformers for these prices? If made at all they must be reliable as they cannot be expected to have much attention. Some saving could be made in the main cost of the transformer, as with greater internal drop, which could be compensated for, it could be made cheaper. Rural installations and special cases could also stand greater costs, and other assumptions will give different figures, but it does not appear too optimistic to expect something along this line.

Line Type Regulators

With modern developments it is no longer necessary to have a regulator in a substation under the watchful eye of an operator. Small regulators are available which may be mounted on poles or in vaults, and the feeder may be split into several parts, each with its load center. The average load center is thus advanced closer to the load or the distance to last customer made less. The copper from the old center to the new centers may be less, and also the copper from these to the average transformer. The latter is obvious if we allow, say, 1 per cent drop from the load center to the transformer. If the drop between the two centers is ¼ per cent, the old system would allow ¾ per cent for the drop from here to the transformer, and in the new system we can raise this to 1 per cent.

Where a load is evenly distributed and all of the same character and the branch feeders are approximately of the same length there is no advantage of multiple regulators as the regulation center may be advanced beyond the actual center. In the more general case, however, two or more types of load may be served, as residential and commercial, or the load may be scattered out. Separate regulators would then not only save in line cost, which could be easily calculated for any actual case, but would give a standard of regulation which could not be obtained from a single unit. Rearrangement of primaries and fewer feeders could be accomplished in some cases.

Smaller size regulators cost more per kva., limiting their use by that amount; it is felt, however, there is room for improvement in this respect; perhaps they can be made simpler, or perhaps other forms can be developed, or tap-changing auto-transformers used. Here is another definite problem for the manufacturers. Any kind of a tap changer must smooth out the steps, to avoid flicker.

Another use for small regulators would be at special places on feeders already regulated at the substation, making possible long extensions, combining lightly loaded feeders, or serving loads of different peak characteristics. As only a few per cent of additional regulation would be required, they could be quite small with the coils connected in parallel for the required carrying capacity. For example, area N on the circuit C-1 of the problem paper is fed by long laterals and would be benefited by a sub-regulator installed at any convenient place on the lateral ahead of the load and set for about the center of area N. The main regulator should then be reset for the center of area O.

The area served by circuit C-2 is more difficult to benefit as commercial and residential connections are on the same sub-laterals. Rearrangement of the lines to separate the two types of load, with a sub-regulator, would be very beneficial, but a sub-regulator on the heavily loaded apartment house lateral, along First St.—as being the most heavily loaded part—would much improve the voltage in this area and would allow the main load center to be advanced along the other laterals.

It is quite plain that less expensive regulators, designed for 2 per cent to 4 per cent buck and boost, will be required to make much improvement along these lines. At best it is putting two regulators in series which is an inefficient use of equipment.

Voltage Regulation
Third Prize Answer to the Problem: "How Important Is Voltage Regulation? What Are the Most Practical and Economical Methods of Achieving It?"

Present Equipment

The above shows how improvements can be made by the use of new equipment. The more practical problem is the more efficient use of what we now have. It is felt that our systems have been built up too much along standard lines—especially the parts now under consideration. We have used the same size regulators, the same size feeders and laterals, and tried to make each part standard. There is nothing wrong with standardization, but it must not be an excuse for failing to work out the most efficient part of each installation. Anyone in the industry can point out numerous instances of unused or wrongly used equipment—not all of it, either, due to the depression.

When present systems were designed it was good practice to make all losses as small as possible. Power is now, however, worth less than it was then—permanently worth less; also there is a great surplus at present. Leaving out of consideration the fluctuating price of copper, let us examine the system to see how we can *increase* losses and thus lower the required capital. Wire sizes, for one thing, can be much reduced before approaching the carrying capacity, or transformers can have greater internal drop. The losses in these have been kept low, partly to improve the customer's voltage, but the buck and boost capacity of regulators is seldom utilized to the full. In this connection how often do we approach the ideal condition of equal drop to all sub-branches of a feeder? Smaller wire in the short run is more economical than large wire in the long branches; even the deliberate introduction of resistance or reactance is possible. No one wishes to take down copper and put up smaller, but by a few changes as indicated by careful study, the standard of regulation could be raised on many feeders, and as the load grows the feeder may be made to grow into the more ideal arrangement.

In substations we find regulators not only unloaded but using in many cases not more than one-half or one-third of their regulating capacity. We find several regulators serving the same kind of load that advance and retard together, where a bus regulator could be used, or where two feeders could be put on one regulator cut over to double current and 5 per cent. It should be remembered that we are trying to maintain good average conditions, the comparatively rare case where two feeders are thrown together in emergency, or

to work on one, does not warrant very much overload capacity. Equipment thus released could be moved to heavily loaded spots either at substations or in the field or could be used for new circuits. Certain types of load can be run with little or no regulation and there are cases where a feeder could be attached directly to the bus. Unregulated service, perhaps disconnected or put on low voltage during peak hours, may become of use in the future to supply very cheap power. We are not deriving the maximum good possible from control of transmission voltages—but that is another problem.

Balanced load at peak is considered important, but many circuits do not even approach this condition and nothing is done about it. A little attention here would cost nothing extra and might be the only thing necessary to correct a bad condition.

Just the plain replanning of a feeder may be enough to improve conditions. As an example, consider again the circuit C-2 of the problem paper which is heavily loaded and has unsatisfactory voltage. We may pick five sub-load centers, corresponding to the centers of each of the four main laterals with the fifth at the center of "C" St. The load along "C" St. and First St. near "C" is probably causing much of the trouble as being too close to the present load center. Let us put this on sub-laterals feeding back from the second street above First; substitute smaller main laterals for the light load residential area to the east; and feed back the first sub-laterals near First and "C" streets from the second sub-laterals to prevent them having too high a voltage. This would allow the regulation point to be advanced several blocks closer to the actual load. Additional correction could be obtained by putting in larger wire for the northwest area, and by a secondary network for the southwest. However, other considerations than regulation would be required to justify the latter's cost. If any of these close in sub-laterals had enough connections so it could be depended on to take an average load, we could introduce resistance to hold down its voltage by making the first part of the run iron wire.

Rural Feeders

Let us now look at a long rural line as being the most difficult to regulate. It has in effect a superimposed industrial and domestic load, there are comparatively few transformers of large size and widely spaced, and it is necessary to tap off load all along the main feeder. The close in load cannot afford a long feed back from the load center, and we should not use resistance here as the one or two services cannot be depended upon to load up as current in the feeder increases.

This is the logical place for individual regulated transformers, but as they are not available, a sub-regulator at the middle would have the effect of making the feeder half as long. This will make the drop to an individual transformer less than half what it was before depending on how the wire size decreases toward the end and the places the load is tapped off. Thus the voltage conditions are improved or a saving may be made in copper. An autotransformer for the long end of the line would raise the voltage there, but would only make regulation worse as it would introduce some itself.

A farming community in general is an area, rather than a long line, and is similar to a residential district except in being spread out, for which the higher voltage somewhat compensates. It could then be handled somewhat as a city area with a load center and laterals and sub-laterals, and brought as closely as possible to the ideal of equal drop to all transformers. Here feed backs do not assume so great an expense. The cost of serving the area as a whole must be considered, rather than the large expense which must be put on the few inadvantageously located. Some other layout might make these easy to feed.

There is nothing new or unknown brought out in this paper, but attention is focused on the fundamental requirements in hopes that a slightly different viewpoint will point the way to better practice. We are in the habit of doing engineering work only on new construction, we should now do much engineering on what is built and in service and all but forgotten. We should study over everything at regular intervals to catch up with changed conditions. Our most inefficient practices are due to slow growing changes, which were unnoticed, and which require nothing but ordinary methods to correct. Using the knowledge available we can do a better job on voltage regulation.

Balancing a Service Policy Against Load and Goodwill

By V. E. DODSON

Sales Department, General Electric Co., Los Angeles

THIS problem is of major importance to the utility at the present time. One need only look through any of the electrical magazines of today and the importance of customer relations to public utilities will be realized when the number of cases wherein cities are investigating the possibilities of municipal plants is noted. It is possible that a considerable amount of this type of agitation could be eliminated by the proper type of repair and maintenance service.

The proper solution to this problem should be a balance wherein the expense of the service is offset by the customers' goodwill and the increase in load due to the type of repair and maintenance service rendered. In order to fulfill these requirements the following repair and maintenance service policy is proposed:

1. The general company service policy to be such that it will keep the individual customer reasonably satisfied, each case to be considered individually.

2. The contact men to be especially selected and trained for giving personal service, creating good will and for boosting load when calls are made.

3. An inducement to the customer for *not* requesting free service on his own system and appliances in the form of a credit to be given at regular periods on his bill.

Part 1 of this plan is based on the fact that each customer is an individual and his conception of the amount of free service that he feels entitled to varies by degree. He ordinarily expects only what he is educated to expect, and therefore each should be served only to the extent that it is necessary in order to keep his good will and encourage his increased use of power. Care should be taken not to educate the customer to expect an unreasonable amount of service. Too much service is detrimental and is sooner or later reflected in the power rates. Also, an unreasonable amount of service to an indivudual tends to educate others to expect the same, and, therefore, great care should be exercised in order not to carry the free repair and maintenance service too far.

In order to satisfactorily carry out the policy outlined in Part 1 it is necessary to have contact men who are especially selected and trained for the job. In fact, the success of the proposed plan depends almost entirely on the contact

men. Their selection and training cannot be over-emphasized.

Type of Training

In the selection and training of the men, it should be kept in mind that they are, in many cases, the only representatives that have occasion to appear on the customer's premises except the meter reader. It is, therefore, necessary that they leave a good impression in every detail. They not only must have a thorough knowledge of the service problems which they will encounter, but they should know how to be diplomatic in any statements that must be made. Their purpose is to give personal service and make each contact pay for the utility in terms of goodwill and increased load. Their judgment must, therefore, be above the average so they will know how to handle different situations from the psychological standpoint, as well as to actually perform the particular service.

Many service men can do an excellent job in locating trouble and correcting it, but they still leave a poor impression and it reflects on the utility. This is mainly because they do not know how to obtain the confidence of those being served, and this is usually due to lack of proper approach and follow-up. It is not only necessary to perform the necessary service, but in order to make certain that full credit is received for the service it should be reported to the customer, or user, before leaving the job. This is where many service men fail.

The contact men should be trained in all of the fine points of high grade service. They must be impressed with the responsibility they have in creating goodwill as well as giving first class repair and maintenance service. They must realize that their every action and word are intended for this purpose.

The men should be trained to properly boost the sale of additional load. There is no reason why they cannot be sales boosters, for if they handle each call properly they have paved the way to an opportunity to bring up the subject under favorable circumstances. During the repairs or maintenance on the customer's property they can see where suggestions might be made for additional use of electricity. Many times these can be made and sales literature left covering the particular suggestion. This will start the user to visualizing the particular appliance in its planned place and may grow to be a new load. A customer is usually in a very receptive mood after receiving good service in time of trouble and the contact men should be trained to take reasonable advantage of it in order to further goodwill and pave the way for increased load.

Telephone Courtesy

The individual, or personal, type of service should start with the man who receives the telephone calls requesting service, or making complaints. This party should be thoroughly familiar with the distribution system and the type of equipment on the load end of the system. He should also be thoroughly familiar with his company's policies on service and the reasons therefor. He should constantly realize that each call is a personal call from one of his customers who is in trouble and asking for help. The call is usually of major importance to the customer and should be treated as such. By proper and pleasant questioning the party taking the calls can, at times, obtain enough information so that a good idea of the trouble and cause will be known. This will enable him to direct the contact man as to what the actual trouble might be and what repair equipment, if any, to take in making the call.

If the customer seems to resent the questioning on the telephone, it should be pointed out that the desire is to give the best service possible and in order to do this it will save both parties time and trouble if enough information is obtained so that only one trip is necessary. Almost any one is open to reason, and when it is pleasantly pointed out that your desire is to give them better service, they will usually be glad to cooperate. It can, therefore, be seen that if the party taking the calls is of the proper type and properly informed in his duties he can decrease the cost of service by correct handling of each call. He can also impress on the customer the utility's desire to be of service in cases of trouble especially wherein they may be at fault. He can even go so far as to offer suggestions as to way and means for the customer to check or eliminate difficulties which appear to be on his own equipment, if he appears to be in the right frame of mind. It will have its good effect if the party taking the calls will go so far as to thank the user for advising of the trouble, specially if it appears to be on the utility's system.

Good judgment in the handling of cells will go a long way to create confidence and goodwill—in fact, there is no reason why this should not be as important a part of each man's job as his actual physical work. The physical work must be done in most cases under any condition. Therefore, why not train the men to do the whole job at once, even to the extent of boosting sales? Who is in a better position to perform these necessary functions? The service man is *asked* to call at the customer's property. He performs a service which is usually appreciated. He has an opportunity to size up the customer's load. Many times he is asked questions which may seem unimportant to him, but are important to the customer. He can gain confidence by proper interest and intelligent answers —thus creating a favorable position for sales approach. The service man is usually more familiar with the appliances than a trained salesman, especially from the design and operation standpoint. Therefore, why not train him in the sales appeal as well, and let him use his combined knowledge to build load? If this is done, he may be able to turn a call "to put in a new fuse" into a sale of additional load and hence make the call pay in every respect.

Source of Personnel

One may ask where this kind of a personnel can be obtained. There are many service men now employed who could be trained to fill the standard sets if they are trained by a person who is genuinely enthusiastic and tactful in presenting the plan and impressing the detailed essentials. There are also many engineering graduates from universities and colleges who are anxious and willing to work and learn at the same time. The engineering graduates will have the best background for solving problems of repair and maintenance that are out of the usual run, and although it would take some time to break them in, they should develop to fill the requirements to better advantage.

It is very important that the instructor be of the genuinely enthusiastic type, who is capable of instructing and instilling enthusiasm into his men. He must realize the importance of every detail of the plan and impress each detail in such a way that its full importance is realized and kept in mind. The men must understand that they are expected to be above the average and that their business is to create goodwill and build load through their excellent repair and maintenance service. They should be trained to realize and take advantage of the excellent position which they are in, in order to perform their duties. The class of the service rendered by the men will be no better than the care taken in their selection and instruction, and therefore, the men and the instructor must be chosen accordingly.

Free Service

Third prize answer to the problem: "How Much Repair and Maintenance Service Can and Should the Power Companies Give Their Customers?"

The third part of the plan, requiring an inducement to the customer for *not* requesting free service, in the form of a credit, is intended to make the customer think about the cost of the service before making the call. He will try to balance the cost of the particular repairs or maintenance against his regular credit and in many cases will check the trouble and make the repairs himself. Also it will tend to throw the repair and maintenance service toward the contractor-dealer, and thus tend to keep their goodwill. The amount of the credit will, to a large extent, determine the procedure which the customer will take.

At first it may appear that the credit is an additional cost to the utility, but if it is properly set it should, in fact, result in a large saving. Careful study and analysis should result in the setting of a regular credit which would save considerable expense due to the decrease in repair and maintenance service calls.

It is essential in repair and maintenance service to form a plan which will not induce the user to call for unlimited repair and maintenance service. Therefore, if the inducement is properly set and advertised, it will automatically tend to limit the expectations of the public.

In order to obtain the full benefit from the credit it must be thoroughly understood by the public and the advertising should be carefully planned and carried out. This can be done in part by pamphlets sent out with individual bills. Enthusiastic acceptance of the credit plan by the public should result because it gives each user an opportunity to reduce his bill by his own initiative. It should appeal to the contractor-dealers because it gives them an opportunity to actively solicit repair and maintenance business on a competitive basis. It should appeal to the utility because it keeps it in control of the repair and maintenance service and opens an opportunity to reduce the cost of this service and at the same time create more goodwill and increase load.

In the proposed repair and maintenance service plan it will be noted that the plan is worked out so that it covers the fundamental principles of efficient service, allows service to satisfy the individual, allows an excellent opportunity to increase load, creates an inducement for consumers not to request unreasonable service, gives the contractor-dealer a fair opportunity to obtain repair and maintenance business, keeps the utility in control of the standard of repair and maintenance service and tends to reduce the cost of repair and maintenance service to the utility—all of which should create a standard of goodwill above the average.

Overhead Network as a Means of Lowering Distribution Costs

By STANLEY A. WARD
Southern California Edison Co., Ltd.

THERE are numerous expenditures which are generally referred to as "distribution costs." Many of these, however, are closely defined by considerations other than the necessity of providing the customer with adequate service. In this class are such things as the expense of an elaborate accounting system, required by law and necessary to guarantee to our stockholders a careful conduct of our business, the cost of the refinements in the purchase and handling of material which we have considered necessary to the elimination of waste, and many others. Practical economies in these things can only be made by attacking the problem at the source. Similarly, a study which is primarily concerned with the reduction of distribution costs must be directed to the items which are fundamentally of that classification. Capital investment and the expenses of operation and maintenance must therefore be our chief concern.

We know that operation and maintenance cost varies in some ratio with investment cost. For example, if it were possible to plot the relation between the two, we would find, for a given set of conditions, a curve such as that shown in Fig. 1. It is to be borne in mind that such a curve can be drawn only for a given set of conditions, and the lack of sufficient data in most cases makes the actual construction of such a curve inpracticable. It is used here merely for a purpose of illustration.

From the curve we see that as the investment cost decreases below a certain point there is a sharp rise in operation and maintenance cost. Beyond this point there is a reasonably regular reduction in operation and maintenance expense until the point is reached where further refinement results is very little gain, and the curve flattens out.

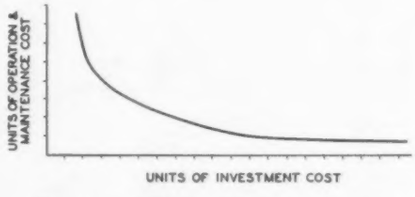


Fig. 1 — Relationship between investment and operating maintenance costs

There are several factors which must be taken into consideration in order to determine at what point on the curve we will choose to operate. In considering the construction and operation of an entirely new system in virgin territory, it would be well to forecast as accurately as possible the growth of business and the probable economic trend. Make a careful study of the relative cost of material and labor, and determine the degree of perfection of service that will be required. With the experience of past years and the information available on existing systems, it should not be difficult to arrive at the most logical choice.

The problem with which we are confronted, however, is not the design of a new system, but how best to utilize the one we already have, and most economically expand its capacity to meet growing needs. Let us first consider the factors which determine the point on the curve at which we chose to operate, and locate that point with reference to the conditions prevalent at the time of choice and those in existence now.

With the rapid growth of the industry in the last few years we have extended our service into a great deal of territory, and consistent with good engineering practice, have provided facilities in advance of the need. For this reason and because of the excess investment necessary to original installations, our investment cost has been high. In keeping with the modern practices of other professions and to further increase the growth of the industry, we have set ourselves a high ideal of service. With yearly revenue constantly growing and new load being added daily, we were economically justified in operating at a point far out on the flat part of the curve.

Now a change has come about in the situation into which we must fit ourselves. Instead of a rapid growth in the physical dimensions of our system, we find the areas to which we have provided service becoming more densely populated and rapidly approaching, or exceeding, in demand our capacity to supply them with the existing arrangement of our facilities. We are no longer economically justified in pursuing the same course that we have in the past to provide service for increased load because the conditions of growth have changed. We have now to provide for saturation business, take advantage

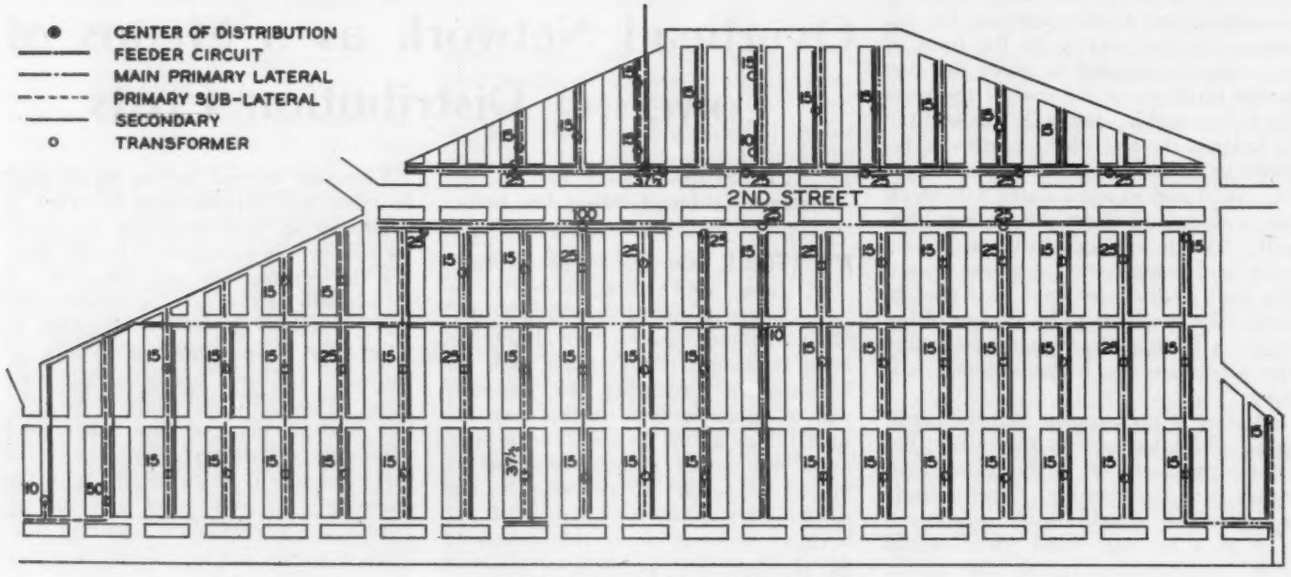


Fig. 2—Map of typical urban area

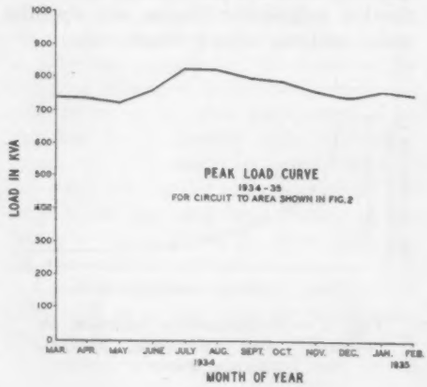
of the margin of investment, reduce distribution costs in order to reduce unit cost to the consumer and further the use of electricity. In short, to retire to a point on the curve which is economically practicable in view of the conditions.

Urban areas which form a large part of the territory served are particularly subject to this sort of saturation as they provide a fertile field for the sale of appliances for which we must supply service. The problem of providing additional facilities at a minimum cost and maintaining our high standard of service in such a territory is worthy of considerable attention. Let us consider a typical area; see what the conditions are, and what can be done to remedy them.

A map of a typical area of this kind is shown in Fig. 2. Second Street is 70 per cent built up with commercial buildings varying in size from small shops to large markets and a theatre. The remainder of the area is 80 per cent built up in the proportion of 70 per cent five to seven room houses, and 30 per cent four to six family apartments. Transformer capacity in the substation is 6,000 kva. and serves seven circuits with a maximum demand of 4,600 kva. The feeder circuit to the section shown is 4,000-volt, 3-phase, 4-wire, and 3,800 ft. long. Main conductors from station to load center are three No. 2/0 and No. 2 neutral. The capacity of the circuit is 1,400 kva. and the regulators are 200 amp. 5 per cent. A peak load curve for this feeder shown in Fig. 3 indicates a maximum of 830 kva., leaving a margin of 570 kva. in available capacity. The distribution transformer capacity in the area totals 1,430 kva. and is allocated as shown in Fig. 2. Distribution from the load center is by means of 3-phase laterals of No. 2 wire and 1-phase sublaterals of No. 4 wire. Secondaries were originally No. 4 wire and have been 15 per cent replaced by No. 2 wire. Secondary runs are in most cases about 300 ft., two ways from the transformer, and are so loaded at the present time that the installation of heavy appliances requires some rearrangement of facilities.

It is apparent from an examination of the foregoing data that the load capacity of the system is limited by the peak load on the individual transformer and secondary units which compose the last step between station and consumer. A comparison of the peak load on the feeder and the total distribution transformer capacity shows an excess of 600 kva. installed and yet the system appears to be loaded from the standpoint of the individual consumer. This discrepancy is partially explained by the primary line loss between center of distribution and transformer, and secondary line loss between transformer and ultimate consumer. These losses can be reduced by increasing size of wire, relocation of center of distribution, shortening secondary runs and similar changes. Remedies such as these are expensive, however, and there is another factor which can be used to advantage to provide some additional capacity at considerably less expense. It is the diversity of demand between units of the system.

Fig. 3—Peak load curve for area shown in Fig. 2


LOAD IN KVA
PEAK LOAD CURVE
1934-35
FOR CIRCUIT TO AREA SHOWN IN FIG. 2
MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB.
1934
1935
MONTH OF YEAR

The diversity factor is a very important element in supplying electric service. If it were not for the fact that the maximum demands of all the consumers does not occur at the same time, much greater investment would be required to serve them. We take advantage of this factor in the design of our transmission and substation systems. Why not carry it on into the distribution system?

Diversity factor is defined as the ratio of the sum of the maximum demands of the subdivisions of a system to the maximum demand of the entire system. It has been calculated that the diversity factor between transformers is 1.3 and between residence lighting consumers, 2.0. There will also be a certain diversity between commercial areas and residential areas. The larger the number of transformers and consumers involved, the more surely we can depend on this diversity. To take advantage of this diversity there must be an interconnection of transformers and secondaries in order to make available the excess capacity of the underloaded unit to relieve the overload on another. Let

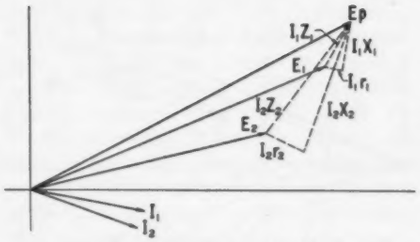


Fig. 4—Vector diagram for two transformers of different impedances

E_p = Primary voltage referred to secondary.
E_1 = Secondary voltage of transformer No. 1.
E_2 = Secondary voltage of transformer No. 2.
I_1 = Load current of transformer No. 1.
I_2 = Load current of transformer No. 2.
I_1Z_1 = Impedance vector of transformer No. 1.
I_1x_1 = Reactance vector of transformer No. 1.
I_1r_1 = Resistance vector of transformer No. 1.
I_2Z_2 = Impedance vector of transformer No. 2.
I_2x_2 = Reactance vector of transformer No. 2.
I_2r_2 = Resistance vector of transformer No. 2.

us consider the possibilities of this.

The four conditions which must be observed in the parallel operation of transformer in the order of their relative importance are:

1. Equal voltage ratings.
2. Equal ratios of transformation.
3. Equivalent impedances which are inversely proportional to their current ratings.
4. Ratios of equivalent resistance to equivalent reactance which are equal.

A factor of prime importance is like polarity, since parallel connection of transformers of opposite polarity will result in a circulating current which will be of the magnitude of a short circuit current. Selection of the proper connections will avoid this condition and it is necessary only to see that differences in polarity are adjusted by transposition of external connections before parallel is made.

If transformers do not have equal voltage rating, the secondary voltages will be different and a circulating current will result. The magnitude of this current will depend on the voltage difference and the impedance to which it is applied. This is also true of transformers whose ratios of transformation are different.

A difference of impedance in transformers will result in a difference in phase and magnitude of the secondary voltages. Assuming two transformers, of the same voltage rating and ratio of transformation, but with different impedance connected in parallel on the high voltage side only and carrying similar current loads, the relation of the secondary voltage will be as shown in Fig. 4.

If these transformers are connected in parallel on the low voltage as well as the high voltage side, this potential difference will no longer exist as the impedance drops will be equal due to the flow of less current through the one of higher impedance and there will be no circulating current.

If the impedances are not inversely proportional to the current outputs which produce the maximum safe temperature rise in the transformers they will not divide the load properly and some will become over-heated while others are below their safe temperature unless the system is operated at less than rated capacity.

If the ratios of equivalent resistance to equivalent reactance are not the same for all the transformers, the currents delivered by them will not be in phase with each other or with the load currents and the transformers will be carrying kilowatt loads which are not proportional to their current loads. As a result the copper loss for given load on the system will be greater than it would be if all the currents were in phase. In other words, the maximum safe kilowatt output will be diminished.

However, the division of load between transformers operating in parallel does not depend on the distribution of the resistance and the reactance between the windings, but merely upon the equivalent impedance.

If the secondary currents delivered by any number of transformers connected in parallel by I_1, I_2, I_3, etc., then since the impedance drops must all be equal:

$$I_1Z_1 = I_2Z_2 = I_3Z_3 \text{ etc.},$$

and

$$I_1 : I_2 : I_3 \text{ etc.} = \frac{1}{Z_1} : \frac{1}{Z_2} : \frac{1}{Z_3} \text{ etc.} = Y_1 : Y_2 : Y_3 \text{ etc.}$$

The currents delivered by the transformers are therefore inversely proportional to their equivalent impedances. The total current, I_R, delivered by the system will be the vector sum of the component currents delivered by the separate transformers.

Vectorially $I_R = I_L + I_2 + I_3$ etc.

Fig. 5 is a vector diagram for two transformers having equal voltage ratings and ratios of transformation, connected in parallel and sharing a load current I_R. No load current is neglected. In the diagram the impedances are in the ratio of 1:2, illustrating the division of load, hence:

$$\frac{I_1}{I_2} = \frac{Z_2}{Z_1} = \frac{Y_1}{Y_2} = 2$$

Also the ratio of equivalent resistance to equivalent reactance is 1:1 for transformer No. 1 and 1:2 for transformer No. 2 to demonstrate the phase relation produced in the load currents by such differences.

The equivalent circuit for transformers having the same ratio of transformation and operating in parallel is as shown in Fig. 6.

Applying the principles outlined in the above discussion to the conditions existing in the areas shown in Fig. 2, we can draw the following conclusions:

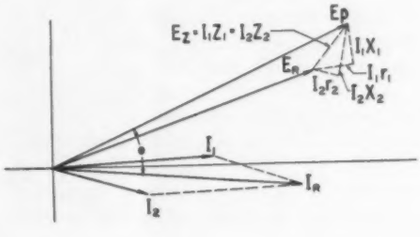
The voltage ratings of all the transformers are the same: 2300 to 115/230.

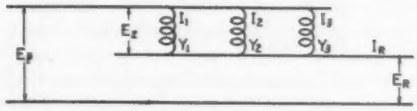
The ratio of transformation of all the transformers is the same: 10 to 1.

Since the transformers are nearly all of the same age and manufacture, their equivalent impedance will be of the

Fig. 5—Vector diagram for two transformers connected in parallel

E_p = Primary voltage referred to the secondary side.
E_R = Secondary voltage.
E_Z = Voltage drop due to transformer impedance.
I_1 = Load current taken by transformer No. 1.
I_2 = Load current taken by transformer No. 2.
I_R = Total load current.
$O = \cos^{-1}$ power factor of load.
I_1Z_1 = Impedance vector of transformer No. 1.
I_1x_1 = Reactance vector of transformer No. 1.
I_1r_1 = Resistance vector of transformer No. 1.
I_2Z_2 = Impedance vector of transformer No. 2.
I_2x_2 = Reactance vector of transformer No. 2.
I_2r_2 = Resistance vector of transformer No. 2.





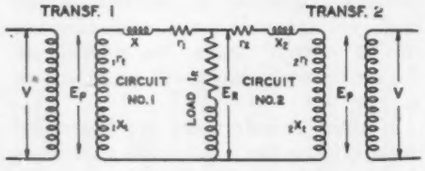
NOTATION IS THE SAME AS IN FIG. 5

Fig. 6—Equivalent circuit diagram for transformers connected in parallel

same order. However, since the proposed plan is to operate transformers in parallel which are not at the same physical location, the impedance of the line connecting them must be taken into consideration. This is in series with the impedance of the transformers and the resistances and reactances of line and transformer can be totaled in each case to give an equivalent impedance. The effect is to balance differences in the characteristics of the transformers. For example, given a circuit such as that shown in Fig. 7:

Let the relation of the equivalent resistances to equivalent reactances and the equivalent impedances of the transformers be as shown in Fig. 5. Then with the line resistances and reactances equal and of a value approximating actual conditions, the vector relations of the currents and voltage will be as shown in Fig. 8.

It is evident from a comparison of Fig. 8 with Fig. 5 that the addition of an equal line impedance to each of two transformers of such different characteristics results in a more equitable division of load and a reduction in the phase difference of the currents taken by the two transformers. Under the actual conditions in the area under consideration, no such wide difference in characteristics is found in the transformers themselves, but depending on the location of the load with respect to the transformers the line impedance will cause a phase difference in the load currents. For instance, if the line impedance in circuit No. 1 in Fig. 7 is zero, or in other words if the load is concentrated at transformer No. 1, then the line impedance in circuit No. 2 will be twice its former value. The phase angle of the current taken by transformer No. 1 will be determined simply by the ratio of equivalent resistance to equivalent reactance in the transformer itself while the phase angle of the current taken by transformer No. 2 will be determined by the ratio of the sum of the equivalent resistances of the total line and the transformer to the equivalent reactance of the total line and transformer. Also, the current supplied by transformer No. 2 will be small in comparison with that supplied by transformer No. 1 due to the ratio of impedances. However, since the individual transformer capacity in the area is in most cases sufficient to provide service for a considerable increase in load if that load is located at the transformer pole, this is not the condition with which we are concerned. Rather we are concerned with that load which can be added at the ends of the secondaries or at intermediate points. Referring again to Figs. 7 and 8, it is evident that with transformers of similar characteristics and at comparable distances from the load, the load currents taken by them will be approximately in phase and the total load current I_R will be nearly represented by the arithmetical sum of the component currents as well as equal to the vector sum of them.



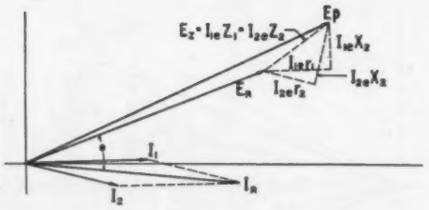


Fig. 7 (left)—Schematic diagram for a typical circuit. Fig. 8 (right) Vector diagram of a typical circuit

V = Primary voltage.
E_p = Primary voltage referred to the secondary.
E_R = Receiver voltage.
I_1 = Load current of transformer No. 1.
I_2 = Load current of transformer No. 2.
I_R = Receiver load current.
O = $\cos^{-1}$ power factor of load.
$_1r_t$ = Equivalent resistance of transformer No. 1.
$_1x_t$ = Equivalent reactance of transformer No. 1.
$_2r_t$ = Equivalent resistance of transformer No. 2.
$_2x_t$ = Equivalent reactance of transformer No. 2.
r_1 = Resistance of line between transformer No. 1 and load.
x_1 = Reactance of line between transformer No. 1 and load.
r_2 = Resistance of line between transformer No. 2 and load.
x_2 = Reactance of line between transformer No. 2 and load.
$e^r1 = r1 + 1r_t$ = Equivalent resistance of circuit No. 1.
$e^x1 = x1 + 1x_t$ = Equivalent reactance of circuit No. 1.
$e^r2 = r2 + 2r_t$ = Equivalent resistance of circuit No. 2.
$e^x2 = x2 + 2x_t$ = Equivalent reactance of circuit No. 2.
e^Z1 = Equivalent impedance of circuit No. 1.
e^Z2 = Equivalent impedance of circuit No. 2.
$I_{1e}Z_1$ = Impedance vector of circuit No. 1.
$I_{1e}x_1$ = Reactance vector of circuit No. 1.
$I_{1e}r_1$ = Resistance vector of circuit No. 1.
$I_{2e}Z_2$ = Impedance vector of circuit No. 2.
$I_{2e}x_2$ = Reactance vector of circuit No. 2.
$I_{2e}r_2$ = Resistance vector of circuit No. 2.

In a typical section of the area the conditions are as shown in Fig. 9. Let us assume that the primary voltage can be held constant on the transformers and that a 5 per cent voltage drop at the service is all that is permissible, at full load. The equivalent reactance drop of the transformers is 6 per cent and the equivalent resistance drop 1 per cent. Effective spacing is 27-in. and the frequency 50 cycles. Using the approximate formula:

$$\text{Voltage drop} = e = 2I\,(r\cos O_r + {}_1X \sin O_r)$$

we find that at a power factor of 0.9 the maximum allowable load at one end of each secondary is 9.5 kw. or 19 kw. at the adjacent ends of the secondaries. Now if the circuits are paral-

Distribution Costs

Third Prize Answer to the Question: "How Can the Cost of Electric Distribution Be Lowered?"

leled, the permissible load is increased by 30 per cent to 24.6 kw., due to the diversity of demand on the transformers. This is a gain of 5.6 kw. in available capacity at a very minor expense. Then if connection is made to the circuits in the adjoining blocks, a still further diversity of demand exists, increasing the gain in available capacity. Such a secondary network has the advantage of giving regulation approaching perfection, taking full advantage of diversity factors and permitting expansion by simply installing transformers at load centers. We may even install a transformer on every pole and the existing secondaries will suffice to insure full utilization of the equipment installed. Thus by replacement of the primaries only, or the use of a primary network, and the installation of transformers we can expand the system to its ultimate capacity. It is apparent that the cost of this growth will be considerably less than the alternative expense of a complete rebuild with the necessity of replacing poles, providing additional guying facilities, and installing equipment in excess of the need to prevent the immediate recurrence of the condition necessitating the rebuild.

Protective devices are required, however, in a secondary network in addition to those usually used in secondary distribution. We are not justified as yet in providing any greater assurance of continuity of service to the consumer than we have in the past, but neither can it be lessened. Present protection in most cases consists of primary fuses on the transformers. In the event of a second-

ary fault or internal fault in the transformer the primary fuse is blown, clearing that transformer and secondary from the system. This particular section remains inoperative, until the trouble is corrected and the transformer is refused. With the secondaries connected together as well as the primaries, it becomes necessary to provide protection on the secondary side of the transformers. This can be done by the use of expulsion type fuses such as are used on the primary side. Then in case of a fault in the transformer it will clear itself from both primary and secondary and the load will be thrown on the other transformers.

However, if the additional load imposes too great a strain on the remaining transformers, or the fault should occur on the secondary itself, all the secondary fuses may be blown out and leave the entire network de-energized. This would result in an unnecessary interruption of service to many consumers and greatly increase the difficulty of locating the fault. To avoid such an occurrence sectionalizing fuses are used. Since the object of this network is merely to take advantage of the diversity factor and not to guarantee continuity of service in the event

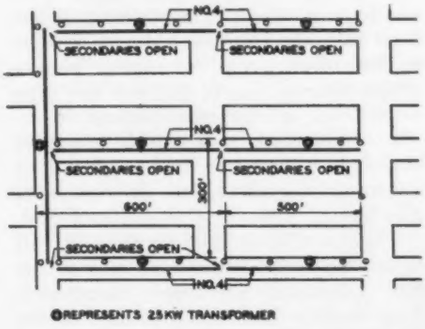


Fig. 9 — Transformer connections in section of the area

of transformer faults, these sectionalizing fuses need be large enough to carry only the expected transfer current from one secondary to another. Then in the event of a fault, if transformers are fused for short circuit operation, the sectionalizing fuses will operate first and clear the particular section from the network. There will be no more outage than under the present system and the expulsion type fuses will provide a ready indication of the trouble.

Also, if the transformer is refused first, no trouble will be encountered in reconnecting the unit to the network. The fuse receptacles can be installed on the secondary arms at transformers and at existing tap locations and no additional dead ending will be required. In an area of this kind where a large portion of the load is of the same character, no greater diversity will exist than has been indicated. The difference in the sizes of the fuses used for sectionalizing and for transformers can therefore be made so great that there will be no question of their selectivity.

A final advantage of the network system is that it is not necessary that an entire district be so connected at the same time. As the load increases in a section, parallel operation can be used there and if, whenever changes are made, the general plan is kept in mind, a network will be formed with none of the expensive large scale changes necessary in other systems.

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Tropical Vegetation Beautifies Skagit River Canyon

Capitalizing upon the natural scenic beauty that characterizes practically all of the West's hydro-electric sites, the City of Seattle Lighting Department is landscaping the environs of its Gorge plant on the Skagit River with tropical vegetation. Carried on as a hobby of J. D. Ross, superintendent of the department, the imported plant life already is giving the garden around Gorge the aspects of a tropical jungle.

Strange as it seems, tropical plants of certain varieties thrive in the mountain climate, some plants already having leaves from 3 to 4 ft. in diameter. In addition to these, Japanese flowering cherries, pink dogwood, rhododendrons and other indigenous blooms are being planted along the cliffs of the canyon. Experiments with tropical birds and animal life reveal that they, too, can well withstand the climate, the theory being that birds migrate for food and rarely on account of temperature. The country surrounding the plant is ideal for bird life such as tropical pheasants, parakeets, parrots, cocatoos, macaws and many other brilliant-hued birds. The orange and gray Brazilian squirrel and the black Mexican squirrel imported to the area seem to enjoy life as much as their native brothers.

In adding to the natural beauty of this Northwest gorge there is being created a garden whose fame is attracting an increasing number of visitors to the spot. Even at night, a concealed multi-colored lighting installation transforms a nearby waterfall into a beautiful spectacle which visitors claim is worth coming far to see.

A tropical plant thrives in the mountain climate of the Northwest where it has been imported by Seattle's City Light as a part of the tropical garden being planted at its Gorge power house.

•

Use Heating Idea as Frost Prevention Measure

APPLYING an idea found described in *Electrical West*, George Pimlock, electrical engineer of Mill Valley and for the Tamalpais Union High School, has installed an electric heating installation for frost protection in the greenhouse of the high school. The system used is that in which a single conductor, monel metal, asbestos-covered wire is strung through a steel tube, strapped to the bottom of the flower beds in the greenhouse.

The system is turned on and off by automatic thermostats which cut in when the temperature drops below a certain figure and cuts out when a maximum temperature is reached. Heating is accomplished chiefly by the induction effect of the single wire in the iron pipe.

Mr. Pimlock points out that there is a very active market for such installations among the owners of many large estates in Marin County, both for greenhouse heating and for frost protection. At the high school, recording instruments are to be placed on the load to determine its cost and its characteristics. The results of these tests are promised to *Electrical West* for future publication.

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• CONTRACTS for turbine flow meters for the initial installation of four 115,000-hp. hydraulic turbines at the Boulder power plant have been awarded to the Bailey Meter Co. by the U. S. Bureau of Reclamation. The meters are of a type which will indicate and record water flow in terms of cubic feet per second and will continuously integrate in millions of cubic feet.

In the Realm of Science + + +

[Devoted to the research and scientific developments which affect the electrical industry and which are being carried on in the engineering departments of Western universities. Edited this month by E. F. Peterson, head of the Electrical Engineering Dept., Santa Clara University]

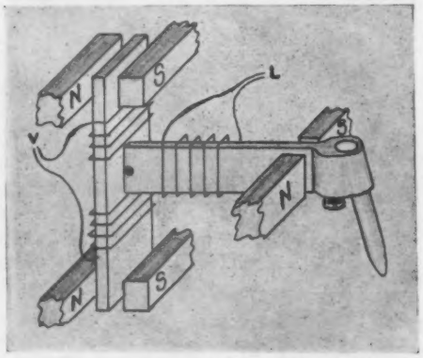
Stereophonic Sound Reproduction

REPRODUCTION apparatus for speech and music has recently taken great strides toward perfection. Apparatus is now available which will reproduce, at relatively low cost, a frequency response flat enough for all discriminating purposes.

In these systems, however, there is a certain lack of quality which betrays the reproduction as such, on account of its "flatness," and it is readily apparent to the listeners that an actual direct presentation is not being made before them. There is a lack of dimensionality which the listener consciously or sub-consciously observes in listening to a direct presentation, and fails to observe if the selection is reproduced by a single loudspeaker. In hearing the actual presentation, the listener hears sound coming from different directions as, for example, when the actors in a play speak from different points of a stage. In the case of the ordinary reproduction, the sounds all come from the same point, the loudspeaker. The same effect can also be observed with a musical reproduction, the effect of loss of dimension in reproduction being equally noticeable.

If the dimensional characteristics of the sound are to be preserved, it has been found that a number of channels of reproduction, each consisting of a single microphone with its amplifier and loudspeaker, will suffice if the microphones are placed at intervals before the performing artists in the studio where they are, and the loudspeakers are placed in corresponding positions on the stage where the reproduction takes place. If these loudspeakers are hidden from the sight of the audience by a porous curtain, the listeners receive the impression that the performing artists are actually on the stage before them. If the selection is a play, the listeners are able to follow the actors about on the stage; if the selection is rendered by an orchestra, the listeners are able to point out the position of various instruments, their position from left to right of the center of the stage as well as their distance back from the curtain. Reproduction which has this dimensional quality has been termed stereophonic reproduction.

Tests made here at the University of Santa Clara by Mr. John Mullin, a student in the Electrical Engineering Department, show that the number of reproducing channels can be reduced to two and that the illusion created still remains very satisfactory. Switching to a single channel, however, destroys the entire dimensionality. Tests made with two channels before members of the student body in the University auditorium showed that they all appreciated the effect of dimensional reproduction. The microphones of two different systems were placed in a pick-up room and the loudspeakers were placed in corresponding positions upon the auditorium stage. Various positions in the pick-up room were given numbers and the similarly situated positions of the stage were correspondingly numbered. As the person in the pick-up room spoke from various stations, the members of the audience were asked to mark on slips of paper the number of the station on the stage from which it seemed that the sound emanated. The results of these tests showed that the members of the audience, listening to the loudspeakers upon the stage, could, due to the dimensionality of the sound, follow the person in the pick-up room from point to point with surprising accuracy. It is needless to say that the accuracy varied for different stations, some being very consistently chosen correctly by the audience, others less so.



Arrangement of stylus for recording two dimensional sound

The results of the tests mentioned above being highly satisfactory, it was decided that it would be desirable to investigate the feasibility of recording the sound from the two microphone positions upon one phonograph record. To use records with two parallel grooves, in each of which a stylus would operate, is not feasible for the reason that a slight change in the relative positions of these styluses would cause a phase shift which would ruin the reproduction. Even if the possibility of phase shift were absent, the playing time of this kind of a record would be only half that of same size of singly-grooved record. It was decided, therefore, to investigate the possibility of recording the sound from each of the two channels upon a phonograph record by one stylus. The system that has been followed employs a device similar to the ordinary disc recorder or phonograph pick-up, except that this new type of recorder is compound instead of single. It consists of a double armature system in a magnetic field produced by a strong electromagnet. A sketch of this special pick-up is shown in Fig. I.

Each armature is driven by a coil connected to the output of one of the two amplifiers previously mentioned. It is readily seen by reference to the sketch that this recorder is a compound device, one armature driving the stylus laterally in the record groove, the other driving the stylus vertically. The result of this compound motion of the stylus point is to produce a record groove which has both varying depth and lateral waviness.

In playing back the recording, the recorder can be used as a reproducer. Each coil of the unit connects to an amplifier and then to one of the two loudspeakers. There is very little interference between the two systems, as oscillographic investigation shows.

Although the experimental unit designed by Mr. Mullin and constructed at the University of Santa Clara had certain weaknesses, especially in the vertical recording, it served, it is believed, to show the feasibility of this kind of double recording for the purpose of attaining the stereophonic effect.

With the Trade Associations + + +

[An Exchange of Plans and Ideas for Assisting the Industry in All Branches to Solve Some of Its Problems of Trade Relations and Business Ethics]

Use the Federal Trade Commission for Codes

By WALTER J. WALSH
Attorney, Biddle Trade Bureau, San Francisco

ACTION of the Supreme Court of the United States insofar as N.I.R.A. is concerned has now brought a challenge to business to regulate itself.

Certain phases of recovery procedure must be discarded. As to other phases we have found them too valuable ever seriously to consider business operations without them.

The ideals of political democracy form the basis of self governing industrial democracy. This means that trade associations, truly representative of their particular field, must be employed to handle mass problems.

Back in 1920 the Federal Trade Commission began a series of trade practice submittals upon which a permanent business structure of fair competition was slowly but soundly building when we were confronted by the N.I.R.A. in 1933. Thus, the Federal Trade Commission might be said to have been developing as a balance wheel for trade and industry, with two broad fields of action, one to proceed against evils; the other to permit right conduct of business, when bsiness requested that certain standards be set up and approved.

Trade Associations were the logical vehicle by which business contacted the Federal Trade Commission and developed ethical business and standards for the Federal Trade Commission to act upon. The development of these Trade Associations was greatly stimulated by the N.I.R.A. and their value where properly managed was easily demonstrated; where their management was too hasty and not sufficiently appreciative of the responsibilities that went with power they proved to be a constant source of trouble.

We have in America a people who, despite many proofs to the contrary, still believe that we can cure any ill merely by passing a law. They cannot seem to realize that an association cannot solve all their problems; it can merely eliminate those sources of friction and irritation that all members agree are nuisances and can only do constructive work in those channels when all agree to have a constructive action taken.

The Federal Trade Commission has five broad divisions: 1. administrative, 2. trial, 3. investigation, 4. trade practice submittals, 5. economic.

Long before N.R.A. came into the picture, some few industrial groups were operating under *trade practice submittals.*

Use Previous Machinery

It is obvious that we should revamp the old method to fit the new order rather than introduce another set of agencies, such as Code Authorities, etc. The machinery is already set up for the next steps.

The first principle to establish is that of *desire* on the part of any industry to govern itself in a sensible way. That desire must be expressed through a truly representative trade association. Next some governmental agency must be in a position to give the stamp of approval to this appeal. We have a division set up to handle this in the Federal Trade Commission.

The second principle to establish is a system of *trade practices* which are fair to all concerned. There is within the Federal Trade Commission a division to handle this problem within definite limits.

The third principle is proper *enforcement.* There is already set up within the Federal Trade Commission the proper divisions which would investigate and try violations of fair trade practice. Cases not settled out of court and involving criminal action could be passed on to the Department of Justice and prosecuted to proper conclusion.

The United States should be divided into Administrative districts corresponding to its economic areas (for the purpose of this article let us say roughly corresponding to the twelve Federal Reserve Districts). Taking the present set-up of the Federal Trade Commission in Washington and duplicating this on a smaller scale in each of the twelve federal reserve districts, there would be an immediate and direct contact with industry from the ground up, rather than from the top down as carried out by N.R.A.

The Change Over

Immediately after setting up such a proposed enlarged Federal Trade Commission organization, one particular industry (coded or uncoded) could take the following steps:

1. Set up a truly representative trade association.
2. Adopt trade practice principles (probably including labor policy, endorsed by the Department of Labor).
3. Systems of enforcement by the industry itself, through the trade association, with the right of appeal by any individual or group to the Federal Trade Commission, thence to the United States Department of Justice.

Very little revamping of the Federal Trade Commission would be necessary.

Intra-state business could be included as fast as the various states saw fit to pass legislation extending present Federal inter-state limitations. Or duplicate state agencies might be set up to cooperate with the Federal Trade Commission as direct representatives in connection with intra-state business.

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New B. C. Contractors Association Formed

DECISION to organize the Interior Electrical Contractors' Association was reached at a meeting of the industry held at Vernon, B. C. recently when electrical contractors assembled from all surrounding cities in the Okanagan Valley. Delegates representing the trade in Kamloops, Revelstroke, Kelowna, Vernon and Penticton all took part in the meeting.

It was pointed out that in all other provinces except British Columbia, an electrical contractor was examined and licensed either by the provincial or municipal authorities. In discussion on this subject it was claimed that lack of this control was in the worst interests of the public and the industry alike. It left the way open for incompetent

work and tended to create accident and fire hazards through faulty workmanship.

Following decision to form the new organization it was further agreed to affiliate with the Vancouver Electrical Contractors' Assn., and unite with that organization in its fight for control of the industry by a licensing system authorized by legislation similar to that in effect in other privinces of Canada.

I. Betts, well known electrical man of Penticton, B. C. was elected president of the organization and R. Peters of Vernon was appointed secretary. A luncheon meeting at Vernon on August 4 was proposed for more detailed development of the Association.

"What Can Be Done Now?"

By S. G. HEPLER
Arrow Electric Co. Seattle, former chairman 11th region, Code Authority for the Electrical Contracting Industry.

THE Supreme Court decision nullifying the NRA was far more sweeping than the declaration of its unconstitutionality in that it definitely limited federal activity. For years, there has steadily grown up within the industry and among labor a feeling and practice based upon the assumption that the Federal Government could and did have jurisdiction over a great many problems and conditions affecting the citizenship of the country as a whole. These feelings and practices were strengthened by the adoption of the Sherman anti-trust laws, the Claybourne act, interstate commerce laws, labor laws, etc.

Trade associations and similar organizations were formed and developed with the thought always in mind that they must keep within the limitations established by federal laws. Various states have passed similar laws but to the average layman they appear more or less in the nature of laws supporting national legislation. The ramifications of the NRA decision certainly clarifies the lines of demarcation as of and between federal and state, and also between state and state. Such clarificawill have quite an ultimate drastic effect upon all types of trade organizations. The shock caused by the decision is rapidly wearing away. The question heard on every side is, "What can be done now?"

Considerable conversation has taken place concerning the decision within the local building industry. Several meetings have been held. A tentative plan has been formulated, patterned after the building trades council of organized labor. The objectives of the plan are to keep in effect, through the cooperative efforts of all sub-branches of the construction industry, the fair trade practice regulations of the codes.

Considerable doubt exists as to the possible effectiveness of the plan but a number of those who hold such viewpoints and who formerly opposed the NRA are now endeavoring to find a workable substitute. A rapidly growing conviction is that unless something is done promptly all the vicious trade practices of the past will re-infest the industry in the very near future. This feeling prevails in spite of the announcements in the press that industry will and can maintain the good features around which NRA was built.

The current assertion is that "no individual or group, without some form of a club with which to keep a few in line, can possibly keep up the standards as set forth in the codes." Therefore, in what form such a club can be, and to what extent it can be wielded, is the vexing problem confronting all organizations. A few of the willing electrical contractors of Seattle are discussing the advisability of a signed contract by and between each with the other. This is fine in so far as it goes, but *the fly in the ointment is*, what to do with those who either do not care to sign or are by nature or design *just chiselers?*

When a federal government, with all its prestige and power cannot make an association effective it seems futile for a few individuals to try. But *hope eternal* is a natural human trait, through it many things have terminated successfully. Hence conversations and meetings will take place and plans will be put into effect, always with the *hope* that such a plan will prove to be the solution of the problem at hand.

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Flatland Returned as S. F. Association Head

LLOYD Flatland, former president, was returned unanimously to the presidency of the San Francisco Electrical Contractors Assn., Inc., at its special election, June 27, 1935. He succeeds Joe Carlson, Central Electric Co., who was president for the preceding six months. Other vacancies made in the board of directors by the change of officers were also filled. Bert Doherty, a former executive committeeman, was elected to the board of directors to replace Mr. Flatland, who now becomes chairman of the board, and Ed Dowd, of Dowd-Seid Electric Co., was elected treasurer and therefore a member of the board in the place of C. B. Kenny, of NePage-McKenny Co. who resigned as treasurer because of a contemplated absence from the city for several months.

The six-month term for president of the association was inaugurated by Mr. Carlson two months ago by a change in the constitution and by-laws providing that the president would serve only six months and that all other officers would continue for a full year. Mr. Carlson felt that the responsibility and the time which the job took from a man's business was such that it was only fair to ask such an officer to serve a short term.

In closing his term of office Mr. Carlson reported the association in excellent condition financially and pointed out economies in the operation of the association amounting to about $100 a month. He urged support of the new officers, cautioned members against expecting miracles, pointed out the individual interests of each member in the valuable system and equipment established which had cost the contractors a considerable investment in money and time. He pointed out that no individual can rise much higher than the organization and that the contractors' problem was not to fall below it.

An outline of a code for the construction industry in the San Francisco County, being worked out jointly by labor and various groups in the construction business and representatives of capital and the public, was read at the meeting. The proposed program was endorsed in principle and is to be resubmitted in final form at a future meeting. Under the plan, wages, hours and working conditions would be maintained at the code status and simplified fair trade practice provisions to prevent bid shopping instituted in the industry. Use of the central bid depository would be enlarged and its functions expanded to make it of greater benefit to the industry. Former President Charles A. Langlais is working on a committee with the Construction Industry Conference in the preparation of this program, it was announced.

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Northwest Inspectors Announce Convention Plans

PRESENTING 28 strong reasons why members of the inspectors association should attend the annual convention, the Northwestern Section, International Association of Electrical Inspectors, has announced its program for the ninth annual convention to be held at the Olympic Hotel, Seattle, Wash., Sept. 3, 4 and 5. The program

may well be termed a super-program, in that it covers so thoroughly all of the activities of the association and its reasons for being.

The actual business program is to be preceded by a Saturday and Sunday trip to visit the Skagit power development of the city of Seattle. Reservations for this trip, which begins Aug. 31, should be made well in advance.

Monday, Sept. 2, is Labor Day, but the executive committee will hold sessions and committee chairmen will call their committees together if possible at that time.

The convention proper begins Tuesday, Sept. 3, with President M. P. Hotelling, of Seattle, presiding. Mayor Charles L. Smith will welcome the convention and S. G. Hepler, representing the Electric Club of Washington, will extend the industry's welcome. Arthur G. Hall, of Toronto, Canada, national president of the I.A.E.I., will speak at the opening session. Featured also on the opening day's session will be three papers on state inspection in Oregon, in Washington and in British Columbia.

Tuesday afternoon's program will contain talks by James A. Smith, executive director, Electric Cord Manufacturers, New York City; Victor H. Tousley, electrical field secretary, N.F.P.A.; Arthur L. Abbott, uniform legislation department, N.E.M.A., New York City, and Herbert G. Ufer, Western superintendent, Underwriters' Laboratories, Inc., Los Angeles. Walter L. Baumgartner, Assistant Corp. Counsel, of Seattle, will speak on "Electrical Codes and the Constitutions." An evening meeting is scheduled at 8 p.m. at which Capt. Stephen E. Samslo, director of educational division of Seattle Fire Department, will talk on "Selling Electrical Safety."

Wednesday morning will continue with a number of the article committee reports which are to begin Tuesday afternoon. It will also have a talk by Howard H. Weber, assistant manager, wire sales, U. S. Rubber Products, Inc., New York City. On Wednesday afternoon a golf tournament and stag dinner for the men at the Rainier Golf Club is scheduled and a sightseeing tour for ladies, with a theater party in the evening.

Thursday's sessions will have as speakers J. L. Husman, vice-president, A.D.T. Co., New York City, on "Signaling Systems;" C. W. Gustafson, chief engineer, Mutual Fire Prevention Bureau, Chicago, on "Explosive Atmospheres;" George M. Boyd, lighting division representative, Westinghouse Electric & Manufacturing Co., Seattle, on "Inside Sunshine;" R. W. E. Moore, electrical engineer, National Electric Products Corp., Pittsburgh, on "Multi-Outlet Assemblies and the New TPR Fuse;" George C. Richards, licensor's agent, New York City, on "Safecote Electrical Conductors" and Dr. Morton G. Lloyd, of the Bureau of Standards, Washington, D. C., on "New Arrangement of National Electrical Code." Thursday afternoon will be devoted to unfinished business and to inspection trips, with a concluding banquet and dance that night.

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Exposition Visits Will Feature Inspection Meeting

HALF of each day at the Southwestern Section, International Assn. of Electrical Inspectors, twelfth annual convention in San Diego, Sept. 10, 11 and 12, will be given over to visits of the exhibits and grounds at the California Pacific International Exposition. This was the unique feature announced by A. E. Johnstone, convention chairman, together with a tentative outline of the program to be presented at the business sessions. Convention headquarters will be Hotel San Diego upon whose roof all of the meetings will be held.

After registration on Tuesday, Sept. 10, the convention will be opened by President Arthur C. Veit, county electrical inspector, Los Angeles County. After the customary greetings from the mayor, president's address, reports of the executive committee, secretary and treasurer of the Southern California Chapter, as well as the appointment of convention committees, the morning's session will also include a talk by George E. Kimball electrical engineer, Industrial Accident Commission, State of California, on "Investigation of Electrical Fires and Accidents." The report of the clearing house committee, which coordinates with similar committees of other sections of the I. A. E. I. on code revisions, will then be given by Ben C. Hill, chief electrical inspector, Oakland, Calif.

Wednesday's meeting will begin after a breakfast session at which there will be informal code rulings and interpretations. Harry V. Dobson, electrical inspector, Santa Barbara, will present Chief Coop, representing the State Fire Chiefs Assn., who will discuss mutual problems in the prevention of fire and the conduct of reinspection.

The international president, Arthur G. Hall, of Toronto, Canada, will give his address at this session. He will be followed by A. R. Small, president of Underwriters' Laboratories, Inc. and chairman of the electrical committee, N.F.P.A., which is the code-making body for the National Electrical Code. Victor H. Tousley, international secretary will also make a report at this time.

Arthur L. Abbott, uniform legislation department of the National Electrical Manufacturers Assn., will give a review of Art. 20 of the National Electrical Code. A. Penn Denton, consulting engineer, Rigid Steel Conduit Assn. will also give an address at this meeting. The Wednesday morning session will close with a discussion of problems of a field inspector by Harold L. Gerber, electrical inspector, Department of Electricity, San Francisco. Henry C. Rice, merchandising manager, Southern California Edison Co., Ltd., will also give a talk on the need for simplification of residence wiring. Wednesday afternoon and evening will be devoted to visits to the fair and to the exhibits.

Thursday morning's closing session will open with a talk by Ralph W. Wiley, chief of the Department of Electricity, San Francisco, on "The Operation of Our Sales Control Ordinance." Following this will come the usual inspectors' problems discussion led by R. H. Manahan, chief of the Department of Electricity Los Angeles.

Dr. Morton G. Lloyd, chief of the Section of Safety, Bureau of Standards, Washington, D. C., will discuss the proposed rewriting of the National Electrical Code as suggested by the utilities last year. Carl E. Hardy, superintendent of the Electrical Department, Oakland, will give a talk on "Signs and Outline Lighting," after which the election of officers and selection of the meeting place for next year will conclude the business of the convention.

"Lest You Forget"

The following pertinent reminders, in a few strong words, were sent to every electrical contractor in the 12th region by Lloyd Flatland, regional code authority, as his parting word after the Supreme Court decision. As he suggested, they are worth pinning up "where you can always see them"

"Wages and hours are easily abused."

"A written bid implies good business conduct."

"Bid peddling and bid shopping is sucker's play."

"Selling below cost is fatal to any business."

"All jobs have a job expense."

"Overhead is like a partner who steals."

"Profits indicate intelligence."

EDITORIAL + + +

Back on the Road to Profits

DON'T sell the future short. Discount the political situation and study some of the business indices. The electrical industry is in for a bull market for months to come. Every branch of the industry should be keyed up to take immediate advantage of this upturn in business.

Here is the substantiating evidence: Utility output for the last two months has exceeded all past records for the same period. Gross and net earnings are on the upgrade. The credit standing of the utilities has never been better as indicated by the 3½ per cent interest rates at which they can borrow funds. Such borrowings have aggregated $450,000,000 since the first of the year. Bond prices are equal to those of 1928 and 1929. Appliance sales are climbing to all-time record peaks. Increases of 35 to 70 per cent are shown right here on the Pacific Coast. Building construction is mounting and authorities predict continuing gains. Deferred industrial maintenance and modernization are being reflected in the sales of electrical manufacturers.

The whole industry can make 1935 the most profitable year since 1929. The time is ripe to swing into action with every sales tool.

What About Men?

LOAD and income are not the only items that have suffered during the depression. Personnel problems have been intensified during the past six years and the reductions in employees together with the lack of advancement characteristic of contraction rather than expansion present an operating problem that today can no longer be ignored. It is time to consider not how but who will be operating the system 5, 10 or 15 years hence.

Employee training to fit the personnel to step into greater responsibilities was an activity that could be suspended while the organization solved the more immediate problems of the depression. Where companies heretofore had had definite programs of selecting young engineering graduates for training, economic conditions forced not only a cessation of this activity but also necessitated the release of many of those young men who had been with the company for several years. Naturally older employees were entitled to the work that was available.

This condition has resulted, in many utilities, in an ever-widening gap between those men who today bear most of the responsibility of the operations and those younger men who are their logical successors, but who have not had the opportunity of growing into their jobs because lack of time, money and new construction prevented giving them added responsibilities. Should this continue for many more years, the electrical utilities will have a highly trained group of older employees ready to meet the demands of the inevitable growth of the industry, but this group not only will have to be spread very thinly in the expanded operations, but also will be handicapped by an acute famine of younger engineers trained in utility practice.

While it may not appear to be good economics on the surface, the utility industry can well afford to make an investment in training younger men now and resuming the practice of recruiting likely talent from the engineering schools to fill the gaps that time and increased demand for electrical energy are bound to produce. When the time comes for such men to step into positions of greater responsibility, the cost of their training will be extremely small compared to the savings they will be able to make in more efficient operations and in being better prepared to serve the public more satisfactorily.

What Price Victory?

AGAIN the overt acts of isolated individuals, too few to be dignified with the term minority, have besmirched the reputation of the whole industry. By resorting to trickery and chicanery in the fight against the Wheeler-Rayburn Bill which every decent-minded person felt could be won by truth and sincerity, these renegades have aroused public suspicion of the integrity of those who fought a fair battle. Even for the vital cause of self-preservation, the industry cannot and will not condone such tactics as were revealed in the investigation of the lobbies for and against the bill.

The questionable methods employed by the administration in support of the "death-sentence" clause of the legislation were such as to focus favorable public attention on the clean fight the utilities were making. To have these courageous and ethical efforts nullified by the revelations of the unprincipled and underhanded acts of unthinking zealots is deplorable.

Until it can convince its every member that he must think and act strictly in accordance with that trite but none the less truthful adage, "Honesty is the best policy," the industry will continue to face a public relations problem.

Not Rates But Use

RELEASE by the Federal Power Commission of detailed information for states and communities on the cost of domestic electricity will necessitate counter activity on the part of the industry to dispel the impression these facts are certain to create in the public mind. The commission's failure to qualify or explain differences in rates, not only in news releases but in the published studies as well, leaves a breach which the industry must plug with factful advertising.

Although the commission's data prove something the industry knows, namely, that electricity is cheap if you use enough of it, the public will not grasp this seemingly obvious fact. Just how this can be explained was demonstrated by Puget Sound Power & Light's president, Frank McLaughlin, in a recent signed statement. He said:

"Our domestic rate schedules are so designed that a customer automatically gets lower rates for increased use. For example, if today all our residential and farm customers had, in addition to present use, an electric range, electric water heater and electric refrigerator in their homes, the average cost for electricity would be less than 1½ cents per kilowatt-hour. On the other hand, it would cost our customers approximately $50,000,000, at present prices, to put these major appliances in their homes.

"So, you can see, rates are not the stumbling block to greater home electrification. The real problem, the big thing right now, is to provide the home with electrical appliances and equipment essential to a greater use of electricity. That is where our customers need help. Cheap electricity doesn't benefit the folks who can't utilize it . . . ."

If the public appreciates these facts, the clamor for lower rates might turn to a hue and cry for government money with which to purchase the appliances. At any rate, here is a selling job necessitated by government indifference, oversight or intention.

Taxless Hoarding

WHENEVER the honorable Huey Long manages to persuade the people to let him "share the wealth" of the nation, just where will he find that wealth stored away? Henry Ford's wealth, according to his commentator Cameron, on the Sunday radio symphony program, is invested in plants, machinery, payroll-making stuff, not only at Dearborn but in a thousand contributing industries whose materials go into making of automobiles. Likewise will be found the wealth of a good many of that small percentage who are said to possess the bulk of the wealth. Such wealth is in active use and cannot very well be split up and divided without causing grave consequences to industries and businesses. It does far more good intact.

Further examination into the wealth of the nation should reveal another interesting situation. Just how much of the nation's wealth is invested in government —that is, federal, state, district and municipal bonds? These governmental securities, backed up by mortgages upon the cities, states and nation itself, have been a most convenient refuge for large chunks of wealth. They bore no taxes, hence escaped paying the share that such wealth should bear of governmental costs. They provided a small but gilt edged income. They presented practically none of the risks that business is heir to, interest payments being exempt from the power to tax.

The fact that the bonded indebtedness of all governmental agencies—cities, states, the nation—has increased by great bounds during the past few years—and as such have provided a place to hoard more and more wealth away from taxation and business—has this fact had anything to do with the crippled business conditions of today? It would seem to be a subject for far more concern than has been given to it thus far by anyone.

To carry this further in its implications, is not this the nut cracker in whose jaws the nation now finds itself? On one side are the heedless political groups advocating more bonds—tax free—to buy more public works—also tax free when completed. On the other side are the wealthy who hoard their wealth in the security of government tax free bonds and deprive business and industry of its use.

Between the two jaws is the public—which must somehow pay the taxes that wealth escapes paying when it hides in government bonds, and which property escapes paying when it is taken over by governmental agencies to operate.

Lest anyone shrug a carefree shoulder and say "I don't pay taxes", let it be realized that if he buys a package of cigarettes, more than half its cost to him is collected in taxes. Every gallon of gasoline takes a few more of his pennies. Every item of food, clothing, medicine—every gas, electric, telephone bill he pays to a private company takes taxes from him.

If he really wants to do something useful, what Huey Long should do for the people is to start a movement to "share the taxes".

News of Note + + +

K. M. Robinson Heads Northwest Association

K. M. Robinson, president, Idaho Power Co., Boise, was named president of the Northwest Electric Light & Power Association for the year 1935-36 at the annual meeting of the association held in Seattle June 28. He succeeds L. R. Coffin, vice-president, Puget Sound Power & Light Co., who has held the office during the past year. George M. Gadsby, president, Utah Power & Light Co., was named vice-president, and the following were elected state vice-presi-

K. M. ROBINSON

dents: for Idaho, R. B. King, Idaho Power Co., Boise; for Montana, J. R. Thomas, Montana Power Co., Butte; for Oregon, L. T. Merwin, Northwestern Electric Co.; for Utah, P. M. Parry, Utah Power & Light Co., Salt Lake City; for Washington, William S. Hill, Grays Harbor Railway & Light Co., Aberdeen; for British Columbia, W. G. Murrin, British Columbia Electric Railway Co., Vancouver.

Members at large of the executive committee were elected as follows: A. C. McMicken, Portland General Electric Co., to represent the utility companies, and H. L. Bargion, Westinghouse Electric Supply Corp., Seattle, to represent the non-utility companies. President Robinson appointed Berkeley Snow executive secretary, and R. W. Miller, Idaho Power Co., Boise, to be treasurer.

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Bids Called For Two More Boulder Power Units

Bids for two 82,500-kva., 180-r.p.m., vertical-shaft, alternating-current generators and two 115,000-hp. hydraulic turbines complete with governors for installation in the Boulder power plant will be received by the U. S. Bureau of Reclamation at Denver on Sept. 9. These are in addition to the four similar units already contracted for.

Bids for the electrical equipment for the Imperial Dam substation of the All-American Canal system will be received by the Bureau of Reclamation at Denver on Aug. 14. Included in the specifications are three 667-kva., single-phase, 60-cycle, 33,000/2,400-volt transformers; one 34.5-kv., three-phase lightning arrester; two 34.5-kv., three-phase, single-throw, gang-operated, air-break switches; three 34.5-kv. expulsion fuses and one outdoor switching and metering equipment unit.

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Pepco Bond Extension Takes Effect Automatically

Hailed by financial experts in Portland, Ore., as one of the most successful accomplishments in the financial history of that city, Portland General Electric Co. successfully completed its financing plan in the latter part of June. Franklin T. Griffith, president, announced on June 28 that holders of $6,547,000, or 90 per cent, of Portland General Electric 5 per cent first mortgage bonds, due August 1, 1935, had agreed to a 15 year extension of the principal.

In order to pave the way for such extension the company had to secure the consent of 85 per cent of the holders of the outstanding issue of $40,000,000 Portland General Electric Co. first and refunding mortgage bonds and on May 1, 1935 the necessary percentage, including 8,000 holders, had been received. On May 15, 1935, an offer of extension of the prior lien bonds was issued by publication and by mail to all known holders of which there were approximately 1,000 scattered in every state in the union. No commissions or other compensation to any underwriting house were paid in the process of securing approval of the extension.

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Pasadena Starts Cycle Changeover of Appliances

A survey of electrical equipment in Pasadena, Calif., which will need adjustment because of change in frequency from 50 to 60 cycles has been started by the Municipal Light and Power Dept.

Questionnaires are being sent out by the department to all consumers, according to B. F. Delanty, general manager. The city will determine from the questionnaires whether it will be necessary to adjust the equipment reported in use. The department will make the necessary adjustments without cost to owners. The adjustment offer does not apply, however, to dealers stocks and demonstration equipment.

Seattle Convention of A.I.E.E. Set for Aug. 27-30

Convening in Seattle Aug. 27, the American Institute of Electrical Engineers will hold its four-day Pacific Coast convention under the direction of Chairman E. A. Loew. Other members of this committee are G. L. Hoard, meeting papers; E. B. Hansen, hotel and registration; L. B. Robinson, finance; R. V. Muffley, entertainment; Wellington Rupp, transportation; George E. Quinan, golf; and J. H. Kelly, publicity.

As convention dates immediately precede the Labor Day week-end, it is expected that A.I.E.E. members from all over the West will combine their vacation and attendance at the convention and thereby take advantage of the recreational facilities of the scenic Northwest.

Convention sessions will be held in morning and afternoon of Tuesday, Aug. 27, and in the mornings of Wednesday, Thursday and Friday. Subjects of wide interest will be covered at these meetings. Student meetings will be held Wednesday and Friday afternoons.

Entertainment planned for the convention includes a dance on Tuesday evening; the annual banquet on Thursday evening; a boatride and luncheon at Sand Point Golf Club for the ladies on Thursday afternoon when the men are competing for the Fisken Cup on the golf course. In addition a fishing contest, to be held one hour before sunrise on the West Waterway, is being arranged by Clarence Rogers.

Inspection trips open for those who attend the meeting include visits to the Skagit development of the City of Seattle, Bremerton Navy Yard, Snoqualmie, Cushman and other power plants.

•

Pacific Electric Awarded Seattle Breaker Contract

Word has been received that the Pacific Electric Mfg. Co. of San Francisco has been awarded the contract for three 196/230-kv. 3-pole oil circuit breakers by the City of Seattle. Two of these units will be installed at the Diablo power plant of City Light which is now nearing completion, and the third will be installed at the Gorge plant several miles below Diablo on the Skagit. The total sale price was $127,250.

•

• LOGAN, UTAH, has awarded a contract to the Busch-Sulzer Diesel Engine Co. for a 5,000-kva. Diesel electric generator set to augment its existing municipal station.

Alta Electric Gets S. F. Bay Bridge Contract

With a bid of $442,939, the Alta Electric & Mechanical Co. and American Building Maintenance Co., 467 O'Farrell St., San Francisco, took the contract for the lighting and electrical installation on the San Francisco-Oakland Bay Bridge, a job which has been the object of great interest in the electrical industry in the West. Seven other firms bid on this big project, the highest bid being 50 percent greater than the low bid, or $648,929.

Bidders besides the Alta Electric were NePage-McKenny and Kenney Brothers, of San Francisco, Portland and Seattle; Radelfinger Bros., of San Francisco; Clinton Construction Co., San Francisco; Newbery Electric Corp., Los Angeles; Bridge Builders Inc. of Oakland; and C. C. Moore & Co., San Francisco.

The electrical installation will include cable runs, substations, control wiring, fog and navigation lights, beacons, and perhaps the largest installation of sodium lamps in the world for illumination of the roadways. The contract also includes the lighting of the approaches.

Alta Electric & Mechanical Co. also has the contract to light the Golden Gate Bridge, and the Broadway tunnel in Oakland and has completed a large number of big contracts in northern California.

•

Death Takes Los Angeles Aqueduct Builder

WILLIAM P. MULHOLLAND, builder of the Los Angeles-Owens River aqueduct and nationally known hydraulic engineer, died at his Los Angeles, Calif., home July 22 after an extended illness. He was 79 years of age. Mr. Mulholland was stricken last December with apoplexy.

His greatest engineering accomplishment was the construction of the Owens River aqueduct, at a cost of $24,500,000, which brings water 250 miles to the city from the Sierra Nevada mountains. Mr. Mulholland also was one of the pioneer backers of the Boulder Dam project and did much of the preliminary work in connection with the $225,000,000 Colorado River aqueduct project of the Metropolitan Water District of Southern California, now under construction. In October, 1923, he began surveys of possible routes for an aqueduct from the Colorado River and in 1928 the results of his studies were turned over to the Metropolitan Water District, formed in that year to carry out the Colorado River project.

Mr. Mulholland was born in Belfast, Ireland, Sept. 11, 1855. He was educated in the public schools of Belfast and attended the Christian Brothers College in Dublin. He came to the United States in 1872.

•

Northwest Utilities to Build New Tie Line

A new interconnection in the Northwest tying in the Ariel plant of Inland Power & Light Co. on the Lewis River, Wash., and the system of the Washington Gas & Electric Co., at Longview in that state, is to be built immediately pursuant to a contract just concluded between these two companies. The line, 25 miles long, will be H-frame wood pole construction, insulated for 66,000 volts with clearances for 110,000, and will have 25,000-kw. capacity. Sixteen miles of it from the plant to a point near Kalama, Wash., will be built by the regular construction crew of Pacific Power & Light Co., owner of Inland Power & Light, and the other nine miles with substation equipment will be built by Washington Gas & Electric Co.

Major economic aspects of the line are that when hog-fuel is short, Washington Gas & Electric is forced to burn a more expensive oil in its steam plant located in the mill of the Longbell Lumber Co. at Longview. The use of surplus hydroelectric power from Ariel at such times will effect an operating saving for that company. Further, this power can be utilized in such a way as to release hog-fuel, which at times is scarce in this area, for use by Northwestern Electric Co., Portland, in its Lincoln Street steam plant in that city, which is used to supply its steam heating load in Portland and to generate stand-by power service. In short, the tie-in will make a larger and more economic use of hydroelectric capacity at Ariel and add a new power source to the Northwestern's system.

New All-Electric Graybar Home

Graybar Electric Co., Los Angeles, now occupies its new quarters at 201 Santa Fe Ave.

The sales and service offices, located on the second floor, are electrically heated with 5kw. semi-flush heaters with thermostat control. The lighting provides for 20 foot-candles in the sales and service departments with diffusing ceiling units. Executive offices are lighted with "SILVRAY" indirect lighting units providing similar intensity.

The third floor warehouse space and the city counter are connected with two-way loud speaking equipment which provides instant transfer of goods by spiral chute from the third floor to the city counter and shipping platform. The accompanying photographs show the outside view from the Santa Fe station, and a view of the sales section on the second floor.

New Features For Seattle's City Light Building

Rapidly nearing completion is the new home of the Seattle City Light Department. This new office building is being constructed in the heart of the city, the foundations being made for an ultimate height of 26 stories, although only two floors will be completed at present. In the basement and sub-basement will be housed a new downtown distribution station with an ultimate capacity of 54,000 kw., taking power from 26-kv. underground cables. Also installed will be a mercury arc rectifier station for the street railway system, rectifiers being selected because of their noiseless operating characteristics and high efficiency.

The two stories above the street level will house the commercial, engineering and executive offices of the department. A feature of the installation will be a heating system employing the reversed refrigeration cycle. Cost of the building is estimated to be $475,000.

●

Washington Water Power Reduces Domestic Rates

Reductions in domestic electric rates aggregating $68,000 a year have been filed by the Washington Water Power Co., in Washington and Idaho.

The new schedules are of a promotional character and incorporate a third block in the residential rates whereby all use in excess of 142 kw.-hr. per month will carry a charge of 2 cents per kw.-hr. The present low step in the domestic schedule is 3 cents per kw.-hr. except for flat rate water heating and an off-peak water heater rate of 8 mills. Both of these latter schedules will continue in force.

Under the new schedule the first step of 32 kw.-hr. carries a varying charge dependent upon the territory served. A second step of 110 kw.-hr. is billed at 3 cents and all over at 2 cents per kw.-hr.

●

Westinghouse Gets Contract For Bureau Frequency Unit

Contract for a 60,000-kva., hydrogen-cooled frequency converter has been received by the Westinghouse Electric & Manufacturing Co. from the Los Angeles Bureau of Power and Light. The price amounts to approximately $700,000. Rated at a capacity far greater than any previously built, the set will be used for interchanging power between the Bureau and the Southern California Edison Co. and will be installed at Wilmington.

Initially, the 50-cycle end will be connected directly to a 50,000-kw. steam turbine in the Long Beach plant of the Edison company. This turbine has been assigned to the city for standby service. Later when the need for such standby service no longer exists it is the Bureau's intention to split the frequency changer set into two units to be used as synchronous condensers on the Los Angeles end of the Boulder Dam transmission line.

●

D. C. Henny, Noted Engineer Dies in Portland

David C. Henny, consulting civil and hydraulic engineer, Portland, Ore., died suddenly in that city July 14. Mr. Henny had gained a national and even international reputation as a consultant principally in the construction of dams. He was consulted on practically every major dam project of any branch of the Federal government in recent years. He became known to the electrical industry largely through his connection with Boulder, Bonneville and Grand Coulee dams.

Born in Arnhem, Holland, in 1860, he was educated in Delft receiving the degree of civil engineer. He came to the United States in 1884 and was employed principally in the railroad, waterworks and irrigation fields. In 1910 he moved to Portland where he has resided since.

For many years he was member of the American Society of Civil Engineers, acting as its vice president in 1932-33 and for a long time as chairman of its Irrigation-Hydraulics Committee. He was an ex-president of the Oregon Technical Council and an honorary member of the Royal Institute of Engineers in Holland. At the time of his death he was chairman of the Oregon State Planning Commission, authorized by the recent legislative session in that state and appointed by the governor.

●

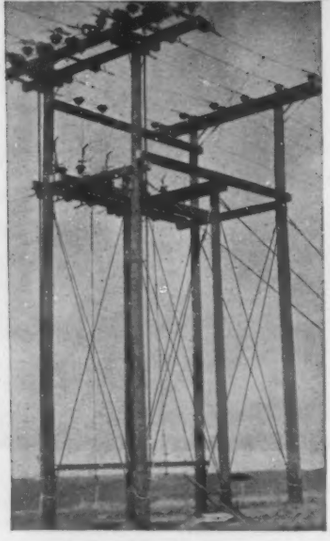
Another Arizona Utility Announces Reduced Rates

Rate reductions averaging 10 per cent have been put into effect by the Salt River Valley Water Users Association in Arizona. The new schedule affects all classes of business.

The new residence lighting schedule carries a $1.00 minimum entitling the consumer to 10 kw.-hr. The schedule then calls for 10 kw.-hr. at 10 cents, 10 kw.-hr. at 6 cents, 20 kw.-hr. at 5 cents, 20 kw.-hr. at 4½ cents, 60 kw.-hr. at 4, 50 kw.-hr. at 3½, and all in excess of 180 kw.-hr. at 2 cents. The combination lighting, cooking and water heating rate starts with a minimum of $3.60 per month, entitling the consumer to 60 kw.-hr. with energy blocks of 250 kw.-hr. at 2½ cents and all in excess at 2 cents.

Crapo GALVANIZED PRODUCTS

INDIANA STEEL & WIRE COMPANY — Crapo Galvanizing — MUNCIE, IND.



Made to Surpass Rigid Specifications

Crapo Galvanized Seven-Wire Steel Strand combines every element essential to dependable, economical line construction and maintenance. The non-cracking, non-peeling *pure* zinc galvanized coating guarantees maximum resistance to corrosion. Proper ductility makes the strand easy to serve. Correct tensile values insure more than ample strength for guys and spans.

These factors are scientifically controlled in all *Crapo* Galvanized Products by vigilant laboratory supervision over each step in manufacture.

You can depend upon genuine *Crapo* Galvanized Steel Strand and Wire to more than meet the most exacting specifications.

Indiana Steel & Wire Co.
Muncie, Indiana

(*Left*) Switching station, Northwestern Public Service Co., Huron, South Dakota. Guyed with *Crapo* Galvanized Seven Wire Steel Strand.

Steel Strand

● ● ●

Telephone and Telegraph Wire

Hotpoint's NEW Mayfair...

● *The cooking ability and general success of any range depends upon the efficiency and long life of its heating elements. The heating units of the Mayfair Model are Hotpoint's famous CALROD units with elements sheathed in INCONEL which permits more rapid heating and offers extreme resistance to oxidation, and lasts longer than any other material used for this purpose.*

WHAT could be more appropriate than that this newest-of-the-new Hotpoint Electric Ranges should be equipped with a Monel Metal Top.

Dealers will find that this Monel Metal Top will make the Mayfair Model irresistible . . . even to those prospects who are only "thinking" of getting a new kitchen range.

Monel Metal is solid, through and through. There is no plating or coating of any kind to crack, chip, or wear away. After long years of hardest service, Mayfair's top of Monel Metal will look like new . . . never rusting, never corroding, never wearing out.

Don't Neglect Water Heaters

This is the season to get vigorously back of water-heater sales. You can now offer a choice, as various nationally-known makes are available with tanks of Monel Metal. This gives you just the argument you need to use with those timid, backward prospects . . . *"IT IS GUARANTEED FOR 20 YEARS."* A sound investment for your customer . . . more profit for you.

Write us for data relative to the use of Monel Metal in kitchen appliances.

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York, N. Y.

Death Brings Changes to Oregon Companies

R. J. Moore, for over 20 years president of the Yamhill Electric Co., Newberg, Ore., died recently after an extended illness. Mr. Moore had worked for the predecessor of the Portland General Electric Co., Portland, since about 1910. When the Portland company bought the Yamhill Electric Co., serving territory in three counties near Portland, Mr. Moore was made president of the subsidiary and has actively managed it from his headquarters in Newberg ever since.

He is succeeded as president of the Yamhill Electric Co. by Franklin T. Griffith, president of the parent company. Actual management of the Yamhill company will be in the hands of A. L. Strickland, manager of another subsidiary, the Molalla Electric Co., who has been elected vice president and manager of the Yamhill Electric Co.

Starting out in the utility business at the time of the installation of the Ashland, Ore., municipal plant in 1908, Mr. Strickland managed that system until 1917 when he went to the Pacific Power & Light Co., Portland. For four years he was district manager in several districts of that company in Oregon and Washington. In 1921 he went with the Northwestern Electric Co., Portland, where he remained 'till 1924, when he retired temporarily from the utility business. The urge to return was irresistible, however, and he took a position in the Portland office of Portland General Electric Co. in 1926, and that company sent him to manage the Molalla property the following year. The Yamhill company covers an extensive territory, largely rural, in three counties adjacent to Portland.

•

Pacific Coast Refrigerator Sales Lead Nation

Indicative of the tremendous increase in appliance sales in the far Western states are the results of the "Call to Colors" refrigerator campaign being conducted by the Westinghouse Merchandising Department in which five Pacific Coast distributors had exceeded their quotas for the two-month sales drive at the end of the first 30 days. The entire Pacific Coast district in one month had made 93.5 per cent of its quota.

Leading the entire United States in percentage of quota achieved was the Westinghouse Electric Supply Co. at Salt Lake City with 229.7 per cent. Other Pacific Coast distributors included among the first ten for the country as a whole were the Electric Supplies Distributing Co., San Diego; Colvin Templeton, Inc., San Francisco; LaMotte & Callaway, San Diego and Westinghouse Electric Supply Co., Los Angeles.

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• SEPT. 12 has been set as the date for a special election at Lodi, Calif., for the purpose of passing on a bond issue of $466,000 for the construction of a dam and hydro-electric plant on the Mokelumne River together with the erection of a Diesel standby plant. The city's municipal system now purchases power wholesale from Pacific Gas and Electric Co. and the proposed installation would provide it with its own source of power.

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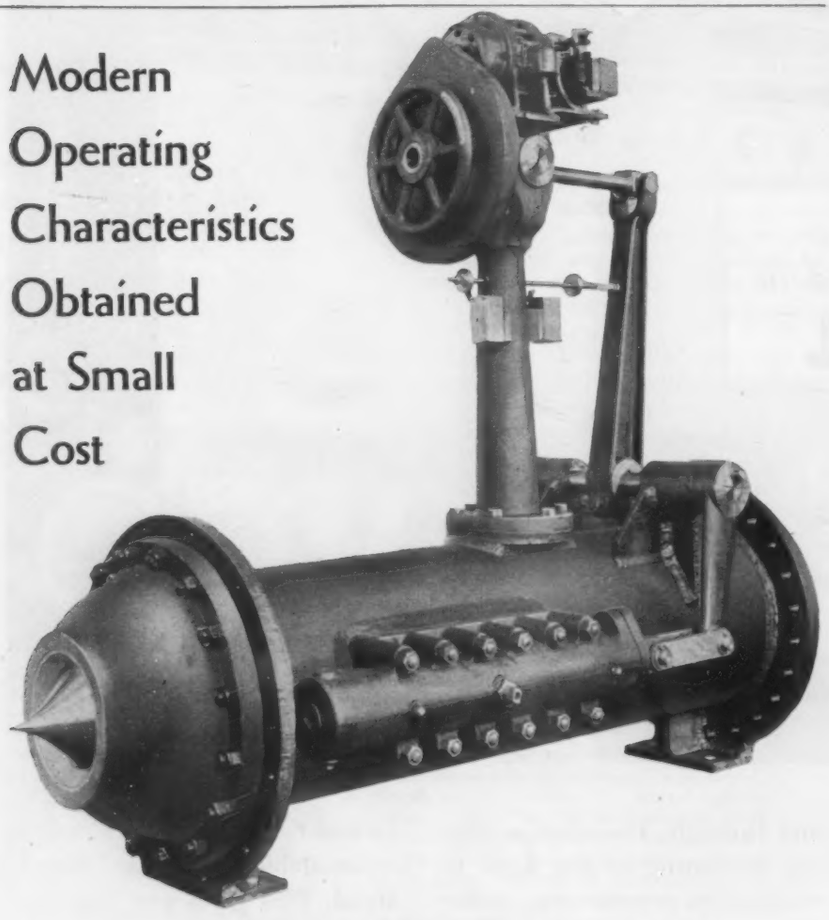
• STANDARDS FOR RIGID STEEL CONDUIT prepared by the industry itself have been issued in printed form and distributed to the electrical industry and electrical trade in general by the Rigid Steel Conduit Assn. The former standards were those of Underwriters' Laboratories which were minimum safety-to-life-and-property standards only. The association has gone a step further in setting forth the manufacturing requirements for rigid steel types of improved characteristics. Simplification and standardization have also been achieved in these standards.

Modern Operating Characteristics Obtained at Small Cost



This modern, high efficiency straight-flow nozzle, together with a runner of latest design, was practically all the hydraulic equipment needed for modernizing a thirty-year-old plant in California. From the standpoint of power output, operating cost, efficiency and safety, the modernized unit is far superior to the original installation, reconstruction costs having been comparatively insignificant.

Further details on this and other rehabilitated plants may be readily secured from Pelton engineers.

The Pelton Water Wheel Company

HYDRAULIC ENGINEERS

120 Broadway NEW YORK | 2919 Nineteenth St. SAN FRANCISCO | Paschall Station PHILADELPHIA

PELTON

...about People

• GEORGE H. WISTING, assistant general manager of the Pacific Power & Light Co., was elected vice-president of the Pacific Advertising Clubs association at the recent meeting of that organization at San Diego. Mr. Wisting has been president of the Advertising Club of Portland during the past year and is a popular civic leader of that city.

•

• PITTS ELMORE, former San Joaquin valley contractor and recently with the Red River Lumber Co., Westwood, Calif., has joined the organization of Geo. V. Kaenel Co., San Rafael distributor for Frigidaire, General Electric appliances and Spalding sporting goods.

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• NORRIS R. MENDENHALL was elected president of the Denver Electrical Contractors Assn., succeeding William A. J. Guscott, who far many years has been president of that organization or prominent in its committees.

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• N. B. HINSON, chief engineer of the Southern California Edison Co., Ltd., has been elected vice-president of the American Institute of Electrical Engineers representing District No. 8.

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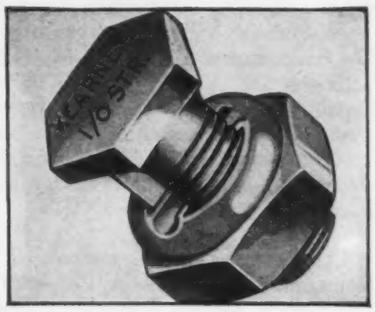
When James R. Kearney, president of J. R. Kearney Corp., St. Louis, made his trip of the West he picked up "Pop" Hartzell, of Maydwell & Hartzell, his Western distributor, at San Diego and traveled north with him through San Francisco and as far as Spokane. Snapped in the front of Maydwell & Hartzell's San Francisco office were the party consisting, from left to right, of T. C. Clark, vice-president and sales engineer of the Kearney corporation; H. S. DeLancie; H. F. Hartzell; Mrs. T. C. Clark; J. R. Kearney, Sr.; Miss S. M. Brown, his secretary, and F. W. Kearney. The entire tour of the West was made by automobile from St. Louis

WHERE TO BUY . . . IN THE WEST

KEARNEY
CON-NEC-TITES
for Better Connections



Smooth, rounded corners — no sharp edges — full round washer — only two pieces to handle — made of brass, bronze or copper — full range of sizes.

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

LAPP
Line Post
Insulators

Lapp Line Post Insulators eliminate radio interference due to both dirt and electro-static conditions.
Write for Bulletin No. 112 describing and cataloguing these insulators.

LAPP INSULATOR CO., Inc.
Le Roy, N. Y.

LOCUST
PINS

Oak
Brackets
and
Pole Steps

Safety • Strength
• Lasting Economy

LOCUST PIN CO.
FRONT ROYAL, VA.

McLAUGHLIN

For Telephone and Telegraph Lines.

GLASS INSUL

PROVIDENCE INSULATED WIRE CO.

Manufacturers of
Type AEIC Service Entrance Cable

PROVIDENCE

Samples and Prices on Request

Concentrically wound bare neutral conductor, galvanized oval armor, weatherproof and flame-proof finish.

For use on entrances without conduit.

Proof Against Theft of Current

PROVIDENCE INSULATED WIRE CO.
PROVIDENCE, R. I.

MAYDWELL & HARTZELL
INCORPORATED
FACTORY DISTRIBUTORS
LOS ANGELES SAN FRANCISCO

Bristol's West Coast Service Laboratory and Assembly Plant

Build new life *plus* automatic control *into your old Recorders*

PERHAPS you, too, have a number of Bristol's Recorders that have given fine service for many years. If so, don't think of throwing them away. They're still good as gold,—worth real money to you.

Re-conditioning will give them new life. Better yet, modernization into recorder controllers will enable them automatically to control your temperatures or other process conditions within the closest tolerances and make possible exactingly uniform product quality.

Having the work done here by Bristol's West Coast Service Laboratory and Assembly Plant instead of thousands of miles away will save both time and money. Write.

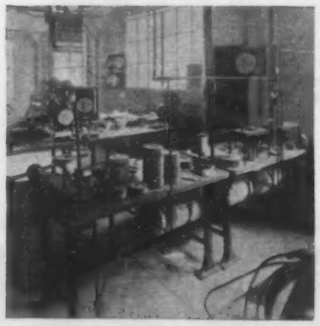
THE BRISTOL COMPANY

Branch Offices: Rialto Bldg., San Francisco
747 Warehouse St., Los Angeles
Branch Factory: 311 Minna St., San Francisco

TRADE MARK

BRISTOL'S

REG. U. S. PAT. OFF.



Bristol's West Coast Service Laboratory and Assembly Plant

• GEORGE CURTISS, for many years secretary of the Pacific Radio Trades Assn., is leaving that organization to enter business as a manufacturers' representative in radio and appliance lines. The move comes in conjunction with the change of the association to that of an institute merely for the handling of radio interference work. Most of the promotional activities of the institute will be handled in conjunction with the sales campaigns of the Electric Appliance Society of Northern California. No trade association or trade practice activities are contemplated by the new organization. Mr. Curtiss has handled the commercial activities of the radio association for many years and conducted its big radio shows in San Francisco.

•

• CLAUDE PEARSON has announced the formation of the Claude A. Pearson Co., 163 Second St., San Francisco, to serve as manufacturers' agent in central and northern California for the following electrical lines: Frank W. Morse Co., Boston, Mass., electrical specialties; American Standard Fuse Corp., Albert Lea, Minn., renewable fuses; The Ericson Manufacturing Co., Cleveland, Ohio, safety rubber electrical devices; North American Carbon Lamp Co.; St. Louis, Mo., carbon lamps, and Raymond Roth, Inc., New York City, Goeller solderless connectors.

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• FRANCIS F. CROCKER, agent of the Southern Sierras Power Co. at Palm Springs, Calif., was recently made vice-president of the Junior Chamber of Commerce of that city.

•

2,700 Per Cent Return

Everything may not be beer and skittles in the electrical business, but H. T. Gentry, meter foreman of the Mountain States Power Co. at Kalispell, Mont., can vouch that Lady Luck sometimes glances our way. On a 30 cent ticket at the American Legion Circus recently held at Kalispell he won the new Ford V-8 which is herewith displayed with its new owner. According to Dick Setterstrom, Montana salesman for Westinghouse, who sent us the photograph, it figures out to be a 2,700 per cent return on the investment—engineers please check

• C. E. BLEE, principal assistant engineer of the British Columbia Electric Railway Co. at Vancouver for the past 12 years, has accepted a position with the Tennessee Valley Authority at Knoxville where he will serve as chief hydraulic engineer. A former assistant professor of civil engineering at Stanford University, Mr. Blee has been connected with the construction and execution of many hydro-electric projects on the Pacific Coast, not only in British Columbia but in California and Oregon as well.

•

• GUY C. EARL, for many years president and general counsel of the Great Western Power Co. and a director of the Pacific Gas and Electric Co., died in Berkeley on June 26. Mr. Earl was 74 years of age. He was widely known throughout California as an attorney and as a former regent of the University of California.

•

• R. G. KENYON, advertising manager, Southern California Edison Co., was the featured speaker at the Electrical Estimators Assn., Los Angeles, recently, talking on the subject of advertising. The title of his talk was "The Sharpest Tool in the Kit." George Rankin, director of lighting, was program chairman.

•

• J. S. ALLEN, Southern Sierras Power Co. and president of the California Safety Society, Los Angeles Chapter, was named by Governor Merriam as a member of the state-wide committee in charge of arrangements for the Western Safety Conference in San Francisco, June 11.

•

• D. P. MASON, for many years purchasing agent of the San Joaquin Light & Power Corp. with headquarters in Fresno, has joined the Universal Safety Co., of San Francisco, automotive specialists.

•

• WILLIAM H. GRIBBLE has been appointed district manager for the Thermador Electrical Manufacturing Co. with headquarters in Fresno. Mr. Gribble was formerly dealer contact man with the Southern California Edison Co.

•

• W. H. HAY, San Fernando Valley real estate man, has been appointed as a member of the Los Angeles Water and Power Commission to succeed the late A. B. Prior.

•

• R. E. JONES, former district manager, Colorado Central Power Co. at Fort Lupton, succeeds G. A. Seaman at the company's office at Englewood. Clarence Koch becomes district manager at Fort Lupton.

...about the Trade

"Dog House" Phamplet Offered by Fred Rea

Particularly pertinent at this time is an attractive little leaflet, one of a series successfully used by many utilities and electric concerns during the past year, issued by the Fred W. Rea, advertising agency of San Francisco. "Our industry is in the Public Dog House," is the inscription which carries the theme of the pamphlet. This is expanded in a humorous and human fashion to show that "for years regarded as a public servant the industry has suddenly been thrust into the nation's dog house" and that the remedy for the situation is to know the real truth and to spread the facts as to company history, policy and the character of its officials and employees.

This pungent message on the back of the pamphlet tells the purpose to which it is dedicated—"When you broadcast facts about your company and your industry you speed the growth of your company and thus increase your own possibilities for better living and for continuous employment."

For the past year, under sponsorship of the Pacific Coast Electrical Bureau, Mr. Rea has prepared a series of pamphlets for including with employee pay checks, as a message from the management on electric appliances and services. These have been designed to stimulate the employee's self-interest so that he too can assist in publicizing the value of these appliances to the public. In the present pamphlet a public relations message is attempted and carried through with skill and good humor.

With some revision of wording similar pamphlets are planned to be sent to consumers or stockholders.

•

• V. E. VINING, who will be remembered to audiences of Westinghouse Refrigeration Shows on the Pacific Coast and throughout the West, has been appointed director of department store sales for Westinghouse refrigeration department. Mr. Vining's pithy and dramatic selling messages have been worked into what he calls "Sam's selling slants," a feature of the promotion of this make of refrigerator. Mr. Vining claims that he once hailed from the West himself.

•

• ALLIED INDUSTRIES INC., manufacturers' representatives, have moved from their location at 455 Second St., San Francisco, where they have been for many years, to a new location at 1135 Harrison St., San Francisco, according to W. S. Greenfield, manager.

Show them *real* electric cooking

—install new units in old ranges and bring them up to date—profitable business for dealers, and a load-builder for power companies. Every old range can be easily fitted with a new set of

CHROMALOX
SUPER-SPEED RANGE UNITS

Ask for details of the sales campaign.

EDWIN L. WIEGAND CO.
PITTSBURGH, PA.

Represented by
MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
524 S. W. Pine St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
912 E. 3rd St., Los Angeles, Calif.
THE PETERSON COMPANY
1921 Blake St., Denver, Colo.

CLIFTON MFG. CO.
65 BROOKSIDE AVE., BOSTON, MASS.

★

Manufacturers of

"ACE" "STAFAST"
"CLIFTON"
Friction and Rubber
TAPES

are Pleased to

Announce

GEO. E. HONN CO.
420 MARKET ST., SAN FRANCISCO

as their

AGENT IN
NORTHERN AND CENTRAL

★ *California* ★

New Manufacturers' Agency Formed in Los Angeles

Organized for the purpose of handling the sales and service for several nationally advertised electrical lines, the Associated Sales Engineers, with offices and warehouse at 912 East Third St., Los Angeles, has been formed by E. H. Bell. For the past several years Mr. Bell has been southern California and Arizona sales representative for the Jeffries Transformer Co. and the Leach Relay Co., both of Los Angeles, as well as for several Eastern manufacturers of electrical equipment.

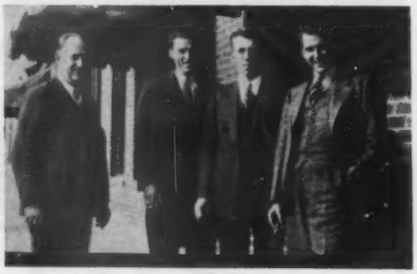
Associated with him will be A. G. Patterson, for many years identified with the sales and servicing of program clock and signaling systems for educational institutions. He will head up sales for the Holtzer-Cabot Electric Co., which has recently announced its entry into the program clock field.

T. F. MacDonough, formerly with the Benjamin Electric Co., will serve as lighting specialist. He will be in charge of sales for the Goodrich Electric Co., industrial reflectors, and Kliegl Bros., theatrical lighting equipment.

In addition to these accounts, the company will represent the Aerovent Fan Manufacturing Co., Piqua, Ohio; Clifton Manufacturing Co., Boston, Mass.; R. W. Cramer & Co., New York City; Diamond Braiding Mills, Chicago Heights, Ill.; Hexacon Electric Appliance Co., Roselle Park, N. J.; Kwikon Co., Chicago, Ill.; Specialty Porcelain Co., East Liverpool, Ohio; Harold E. Trent Co., Philadelphia, Pa. and Toledo Standard Commutator Co., Toledo, Ohio.

Mr. Bell will continue to handle sales for the Jeffries Transformer Co. and the Leach Relay Co. in addition to directing the sales policies of the new organization.

Wholesalers



The Hollywood Wholesale Electric Co. in person. Reading from left to right are Messrs. Lucas, in charge of credit; Watkins, in charge of sales; Stoltz, president, and Pohl, the sales manager. The firm is very active in appliance and wiring supply business in the Los Angeles territory

• U. K. PETERSON, formerly representative of the Peerless Fan Co. in the Portland area, has joined the sales department of the Northwestern Electric Co., Portland. He took the position made vacant by Aza K. Gaylord, commercial lighting and heating engineer, who is now with Portland General Electric Co. Mr. Petersen is to specialize in air conditioning and commercial heating. Prior to going to Portland Mr. Petersen was an electrical contractor and motor specialist in the Oakland, Calif., region.

•

• THOMAS H. DOOLING, for some years New England manager of the Electric Storage Battery Co. with headquarters at Boston, Mass., has been transferred to San Francisco, to direct sales promotion activities of the company in the seven states west of the Continental Divide. Mr. Dooling was formerly connected with the battery company at San Francisco.

•

• SLUYTER ELECTRIC CO., organized and headed by A. J. Sluyter, formerly with the Western Electric Co., opened an electric store at East 65th street and 20th avenue Northeast, in Seattle, on Feb. 15. The store has the Kelvinator refrigerator agency and will also handle radio, washing machines and a full line of domestic appliances.

•

• J. H. BAXTER & Co. has become California representative for the West Coast Wood Preserving Co., of Seattle, according to Dan L. Lindsley, who is making his office with the Baxter company at 601 West Fifth St., Los Angeles.

PROFESSIONAL SERVICES

BYLLESBY ENGINEERING AND MANAGEMENT CORPORATION
Consulting Engineers
General design engineering, investigations, reports and estimates, and construction supervision for new or modernization projects in the Utility or Industrial Fields.
231 South La Salle Street Chicago, Illinois

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory
80th St. and East End Ave., New York

ARTHUR R. KELLEY
CONSULTING ENGINEER
Reports and Valuations, Public Utility Industrial Properties
Edison Bldg. Los Angeles

..in New Equipment

New Guy Guard

For greater visibility with easy installation and maximum safety, the James R. Kearney Corp., St. Louis, Mo., has designed a new guy guard. The Kearney guy guard features are: a full round type guard; absence of dangerous projections and edges; guy guards slide over and cover guy clamps; guy clamp prevented from chafing galvanized wire; and ample diameter guy guard.

●

Automatic Synchronizing Device For Generators

The "Synchro-Operator," an automatic control device which replaces the frequency matcher, the automatic synchronizer and the synchroscope by rapidly performing the functions of speed matching, synchronizing, and visual phase angle indicating, has been announced by Allis-Chalmer Manufacturing Co., Milwaukee, Wis. It is said to synchronize accurately generator and bus even if there is a voltage difference. It can be used in connection with existing governor control motors and station circuit breakers. It is not much larger than the usual synchroscope and can be mounted on a swinging bracket. It consumes little energy, operates through standard potential transformer metering circuits, requires no special features or prime mover or generator and contains no vacuum tubes.

●

New Colt Industrial Switch Line

Greater dependability and ease of installation has been designed into Colt type "A" industrial safety switches, by the Colt's Patented Fire Arms Mfg. Co., Hartford, Conn. The mechanism of the 575 volt type "A" Colt-Noark switch has been improved and simplified to permit longer wear and greater accessibility of contacts for cleaning and adjustments. Other features include the Colt "Quadbreak" switching mechanism, ability of the complete unit block removal without disturbing the rest of the switch, and means to permit the connection of line and load at either top or bottom. The features of the 250 type "A" switch are the "Dual-Break" switching mechanism which has been improved to increase its life and to facilitate cleaning and adjustment of its parts. The cabinet of the switches have been designed narrower, with more wiring space, and refined appointments.

●

Automatic Roaster

A fully automatic roaster that requires but a single setting of its automatic control and regulates its own heat accurately has been announced by the Swartzbaugh Manufacturing Co., Toledo. The capacity of the oven is said to be equal to the oven of any large electric range. The electric heat is accurately measured and controlled to suit cooking needs by a control thermostat which turns the current on and off so that the proper temperature is maintained. The roaster can be used for baking, cold-pack canning, roasting and whole meal cooking. Its wattage is 1,000. The roaster comes complete with heater cord, recipe and instruction book, an oval roasting inset, two half-round vegetable pans, and a center pan for meats and small fowl.

●

Rural Line Transformer

A transformer especially designed to reduce farm line costs, the new Kuhlman rural line transformer has been introduced by Kuhlman Electric Co., Bay City, Mich. At present the transformer is available in only 1 kva. and 3 kva. For easy installation on poles the transformer is provided with simple brackets so that it can be hung from bolts passing through pole or crossarm.

●

New Line of Industrial Reflectors and Flood Lights

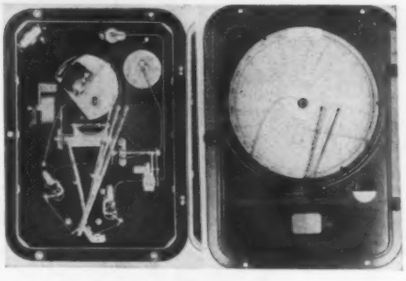
A complete line of Appleton industrial reflectors and flood lights has been announced by Appleton Electric Co., Chicago. This new line is listed in bulletin No. 802.

●

Improved Type Vacuum Power Switch

The Continental Vacuum Power Switch, an improved mercury contact switch, has been designed to eliminate all rotating or tiliting devices by the Continental Electric Co., St. Charles, Ill. The advantages claimed are positive control, no oxidation, high speed operation if desired, nothing to wear out, sealed in high vacuum, and hermetically sealed contact chamber. Being permanently sealed in vacuum permits its use in places where inflammable gases, corrosive atmosphere and dust are present.

●



Mechanical Flow Meter

A new flow meter reported by its manufacturer to meet the demands of a rugged, accurate and reasonably priced mechanical flow meter, has been put on the market by The Bristol Co., Waterbury, Conn. Its features include a metal body of forged steel; assured hair-line sensitivity without jumping and sustained accuracy; hardened stainless steel stuffing box, grease packed and leak-tight; positive action integrator which eliminates friction contacts and clutches; and check valves operated by gravity to prevent the loss of mercury. With Bristol's Metameter, this new flow meter can be supplied as an electric flow meter for remote reading.

WHERE TO BUY IT IN THE WEST

Selling Hints

FOCUS THE BUYER on your listing in "Where to Buy" with a display box. This advertising SELLS goods and costs so little.

ELECTRICAL WEST
883 Mission St. San Francisco

Air Conditioning
Frigidaire Corp.
General Elec. Co.
Graybar Elec. Co., Inc.

Anchors, Guy
James R. Kearney Corp.

Appliances, Household
Apex Rotarex Mfg. Co.
Edison Gen. Elec. Appliance Co., Inc.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
McGraw Elec. Co.
Swartzbaugh Mfg. Co.
Waters-Genter Div.
Westinghouse Elec. Supply Co.

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General Cable Corp.
General Elec. Co.
Russell & Stoll Co.

Brackets, Wood
Locust Pin Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.

Buses
Aluminum Co. of America ..

Cable Accessories
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

Cables
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Maydwell & Hartzell, Inc.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co.

Carbon Brushes
National Carbon Co., Inc.

NCC
PROMPT SERVICE ON CARBON BRUSHES
Our San Francisco Finishing Plant is prepared to make prompt delivery on all grades of National Pyramid Brushes.
A GRADE FOR EVERY TYPE OF BRUSH USING EQUIPMENT
National Carbon Co., Inc.
Carbon Sales Division
599 Eighth St.
San Francisco, Calif.

THE G-E TIME SWITCH FOR CONTROLLING WATER-HEATER LOADS

Cover removed

Saves ON INSTALLATION

YOU should see how easily this switch "installs." It has flexible leads that facilitate wiring; no fittings are necessary. It fits in any convenient knockout; is light in weight, compact, and takes up little space. These features save time and expense.

Then, too, with the G-E Type T-11 switch, your investment is small and your maintenance and inventory costs are low. These savings are possible because the T-11 time switch is especially designed for controlling water-heater loads. Details and prices are given in Bulletin GEA-1669. (See coupon below.)

A *NEW* G-E publication that will be helpful to you is GES-1106, "Revenue in Off-peak Loads Properly Controlled." It also contains information on carrier-current control.

For copies of these bulletins, address the nearest G-E sales office, or General Electric, Dept. 6B-201, Schenectady, N.Y.

GENERAL ELECTRIC

General Electric Company
Dept. 6B-201, Schenectady, N. Y.

Please send me copies of your two new publications, GEA-1669 and GES-1106.

NAME.....

ADDRESS.....

440-54

Where to Buy It in the West—*Continued*

Carbon Products
National Carbon Co., Inc.

Central Station Equipment
Tom Wood

Chimes
Square D Co., Inc.

Circuit Breakers
General Elec. Co.
I-T-E Circuit Breaker Co.
Westinghouse Elec. & Mfg. Co.

Cleaners, Vacuum
Apex Rotarex Mfg. Co.
Clements Mfg. Co.
Cramer Elec. Co.

Coil Winding
Jeffries Transformer Co.

Compounds, Insulating
John C. Dolph Co.
General Cable Corp.
General Elec. Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
J. G. Corrin
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

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Burndy Eng'g Co.
James R. Kearney Corp.

Controllers
Clark Controller Co.

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Westinghouse Elec. & Mfg. Co.

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Wesix, Inc.

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W. N. Matthews Corp.
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St. Louis Malleable Casting Co.

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John A. Roebling's Sons Co.
General Elec. Co.

Fans
General Elec. Co.

Farm Electrification Equipment
General Elec. Co.

Fittings, Conduit
General Elec. Co.

Fixtures, Lighting
General Elec. Co.
Russell & Stoll Co.
Smoot-Holman Co.

Floodlighting
General Elec. Co.
S & M Lamp Co., Inc.
Smoot-Holman Co.

Fuses
Trico Fuse Mfg. Co.

Gasoline
Union Oil Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
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Ground Rods
Crucible Steel Co.
Maydwell & Hartzell, Inc.

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Edison Gen. Elec. Appliance Co.
Montgomery Bros.
Noblitt-Sparks Industries, Inc.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Edw. L. Wiegand Co.

Heaters, Water
Edison Gen. Elec. Appliance Co.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Westinghouse Elec. & Mfg. Co.

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Mend-It Sleeve Mfg. Co.
Edw. L. Wiegand Co.

Illuminating Glassware
Inland Glass Works, Inc.

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Quality Elec. Co.
Roller-Smith Co.
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Weston Elec'l. Instrument Corp.

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Johns-Manville Corp.
C. D. LaMoree

Insulators
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Graybar Elec. Co., Inc.
Hemingray Glass Co.
Illinois Elec. Porcelain Co.
Lapp Insulator Co., Inc.
Locke Insulator Corp.
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Ironite Ironer Co.
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Savage Distributing Co.
Gordon E. Wilkins

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General Elec. Co.
Westinghouse Lamp Co.

Lamps, Student
Lumidor Mfg. Co., Inc.

Lamps, Sun
General Elec. Co.

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Smoot-Holman Co.
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L. A. Nott
Sangamo Elec. Co.
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Weston Elec'l Instrument Corp.

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C. D. La Moree

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General Elec. Co.
Westinghouse Elec. & Mfg. Co.

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Allis-Chalmers Mfg. Co.
General Elec. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

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Associated Oil Co.
Union Oil Co.

Oil, Transformer & Switch
Associated Oil Co.
General Elec. Co.
Union Oil Co.

Panel Boards
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Photoelectric Cells
General Elec. Co.
Weston Elec'l Instrument Corp.

Pins, Wood
Locust Pin Co.

Pole Line Hardware
General Electric Supply Corp.
Graybar Electric Co., Inc.
Hubbard & Company
Joslyn Co. of Calif.
Kortick Mfg. Co.
Locke Insulator Corp.
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Idaho Power Co.
Mountain States Power Co.
Northwestern Electric Co.
Pacific Gas and Electric Co.
Pacific Power & Light Co.
Portland General Electric Co.
Puget Sound Power & Light Co.
San Diego Cons. Gas & Elec. Co.
San Joaquin Light & Power Corp.
Southern California Edison Co. Ltd.
Utah Power & Light Co.
Washington Water Power Co.

Where to Buy It in the West—Continued

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Pacific Coast Sales Manager: WM. P. SWARTZ
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Ranges
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Malleable Iron Range Co.
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California Refrigerator Co.

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General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Malleable Iron Range Co.
Westinghouse Elec. & Mfg. Co.

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Leach Relay Co.
Ward Leonard Elec. Co.

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Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

Switches, Time
R. W. Cramer & Co.
General Elec. Co.
Sangamo Elec. Co.
Tork Clocks, Inc.

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Condit Elec'l Mfg. Corp
General Elec. Co.
Pacific Elec. Mfg. Co.
Westinghouse Elec. & Mfg. Co.

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General Elec. Co.

Testing Devices
Electrical Facilities, Inc.

Tools, Live Line
James R. Kearney Corp.

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American Transformer Co.
E. H. Bell
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General Elec. Co.
Jeffries Transformer Co.
Pennsylvania Transformer Co.
Sangamo Elec. Co.
Western Transformer Co.
Westinghouse Elec. & Mfg. Co.

Tubing, Elec'l Metallic
Aluminum Co. of America

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For Dry Type Industrial and Signal Use

***Repair Service* for distribution transformers, Auto-starters and similar equipment.**

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Pacific Coast Elec'l Ass'n
Pacific Coast Elec'l Bureau

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General Elec. Co.
Square D Co., Inc.

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Welcome Meter Co.

Switches, High Tension
Bowie Switch Co.
James R. Kearney Corp.
General Elec. Co.
C. D. LaMoree
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General Elec. Co.
Meter Devices Co.

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Garland-Affolter Eng'g Corp.

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Colt's Patent Fire Arms Mfg. Co.
Meyers Safety Switch Co., Inc.
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Newport News Shipbuilding & Dry Dock Co.
Pelton Water Wheel Co.

Valves
Pelton Water Wheel Co.

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***For* SAVAGE** Washers & Dryers
- PROMPT DELIVERY
- COMPLETE STOCKS

Savage Distributing Co., Inc.
383 Brannan St., San Francisco

Washers, Clothes
Apex Rotarex Mfg. Co.
Elec't Appliance Service Corp.
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Authorized Factory Replacement Parts Service
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Automatic, Easy, Gainaday, Horton, Meadows, Roto Verso and Universal Washers and Ironers
Parts and Rolls for All Makes
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Performance

IS THE PROOF OF QUALITY

NCC
SA-35
SA
Performance records on "SA" Series brushes establish the superior commutating properties of these new grades for heavy duty D. C. service.

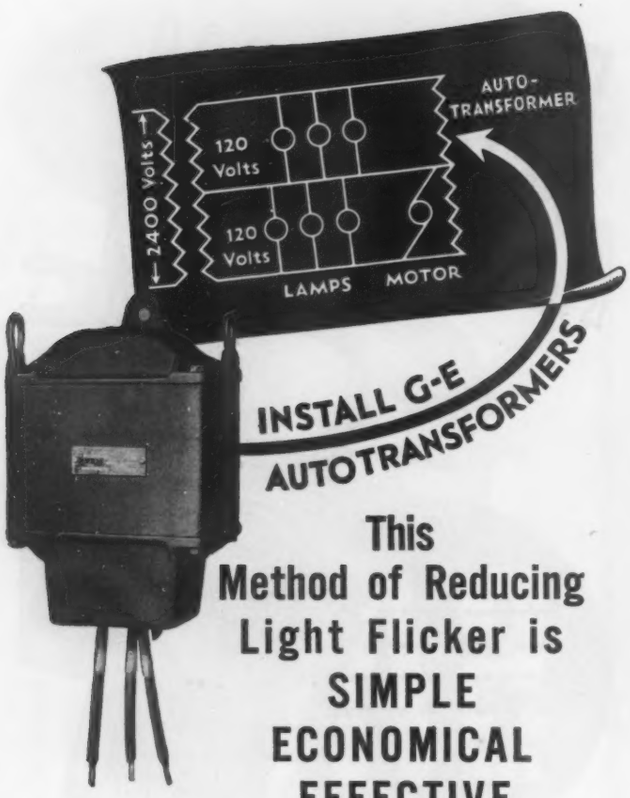
- These records cover machines of 150 Kw to 4200 Kw capacity. They include power, railway and steel mill service.

The broad field of service to which "SA" Series brushes are suited, and the graduated physical properties of the individual grades, permit the selection of a brush with the right combination of characteristics to provide both good commutation and good life.

UNIFORMITY OF PHYSICAL PROPERTIES RESULTS IN UNIFORMITY OF PERFORMANCE

Let us recommend the grade for your service

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide UCC and Carbon Corporation
Branch Sales Offices:
New York • Pittsburgh • Chicago • San Francisco



This Method of Reducing Light Flicker is SIMPLE ECONOMICAL EFFECTIVE

THE starting of 110-volt motors from 240/120-volt, 3-wire lighting circuits may produce appreciable voltage dips which cause objectionable light flicker.

These voltage fluctuations can be materially reduced, and at low cost, by installing small G-E air-cooled autotransformers. By this means, a large part of the motor-starting current is supplied by the 240-volt circuit, and the voltage drop is consequently less than it would be if the current were supplied from the 120-volt circuit. In many cases, autotransformers installed at the end of a 3-wire circuit, as illustrated above, reduce momentary fluctuations as much as 70 per cent.

We have available two publications which describe this method of reducing light flicker in more detail. For copies, simply mail the attached coupon.

GENERAL ELECTRIC

General Electric Company

Dept. 6U-201, Schenectady, N. Y.

Please send me copies of GEA-1971A and GEA-1950.

Name.....

Firm.....

Street.....

City.....State.....

320-55

Where to Buy It in the West—*Continued*

Water Wheels

Pelton Water Wheel Co.

Wire

Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co.
Driver-Harris Co.
General Cable Corp.
H. B. Squires Co.
Westinghouse Elec. Supply Co.

Wiring Supplies

Associated Sales Engineers
Gen. Elec. Supply Corp.
Graybar Elec. Co., Inc.
Russell & Stoll Co.
General Elec. Co.
Graybar Elec. Co., Inc.
Hart Mfg. Co.
Indiana Steel & Wire Co.
C. E. Ingalls
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co.

INDEX TO ADVERTISERS

August, 1935

Allis-Chalmers Mfg. Co. 15
Aluminum Company of America 13
American Steel & Wire Co. 17
Bristol Company, The 58
Burndy Engineering Co. 64
California Oregon Power Co. 2, 3
Clifton Mfg. Co. 60
Columbia Steel Co. 17
Crescent Insulated Wire & Cable Co. 59
Edison General Elec. Appliance Co., Inc. 8, 9
General Cable Corp. ..... Front Cover
General Electric Co. 18, 62, 64
Graybar Electric Co., Inc. 6
Idaho Power Company 2, 3
Indiana Steel & Wire Co. 54
International Nickel Co., The 55
Jeffries Transformer Co. 63
Kearney Corp., James R. 57
Lapp Insulator Co., Inc. 57
Locust Pin Co. 57
Maydwell & Hartzell, Inc. 57
McGraw Electric Co. 4, 5
McLaughlin Glass Co. 57
Mountain States Power Co. 2, 3
National Carbon Co., Inc. 61, 63
Noblitt-Sparks Industries, Inc. 7
Northwestern Electric Co. 2, 3
Owens-Illinois Glass Co. 16
Pacific Coast Electrical Bureau ..... Back Cover
Pacific Gas and Electric Co. ..... Inside Back Cover
Pelton Water Wheel Co. 56
Portland General Electric Co. 2, 3
Professional Directory 60
Providence Ins. Wire Co. 57
Puget Sound Power & Light Co. 2, 3
Roebling's Sons Co., John A. 10
Savage Distributing Co. 63
Southern California Edison Co., Ltd. ..... Inside Front Cover
Standard Electric Stove Co. 63
Utah Power & Light Co. 2, 3
Washing Machine Parts Co. 63
Washington Water Power Co. 2, 3
Waters-Genter Division 4, 5
Westinghouse Electric & Mfg. Co. 11
Weston Elec. Instrument Corp. 12
Wiegand Co., Edw. L. 60
Youngstown Sheet & Tube Co. 14

No. 2 of a Series

Reprinted from "In Gear"—the Pacific Gas and Electric Company's plan for united industry cooperation during 1935.

P·G·and E·

ADVERTISING POLICY

Market stimulation rather than direct merchandising is the broad purpose of P. G. and E. advertising.

It seeks to create public interest in the advantages of modern gas and electric service and desire for the equipment with which to realize those benefits.

For example, we sell Electric Cooking by repeated exposition of the efficiency, cleanliness, etc., of this method and leave to manufacturers and dealers the exploitation of specific makes of appliances, their prices and individual excellence.

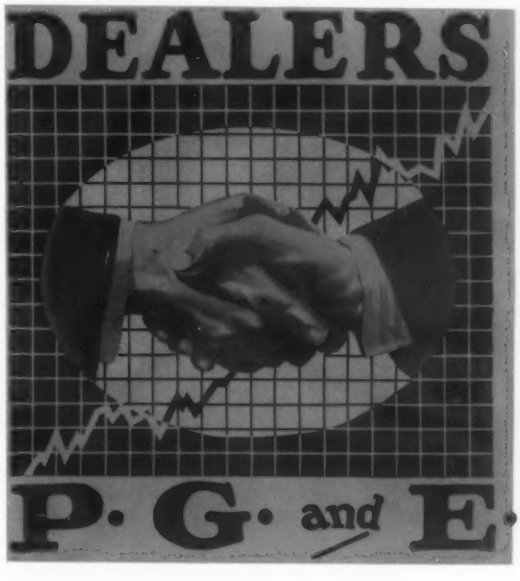
The Company's advertising is educational, informative and stimulative in its varied appeal to the buying public. It is designed to lay the solid ground-work of customer acceptance upon which the salesmen of the Company and dealers carry forward their campaign for actual sales.

The essence of our plan is coordinated activity, the gearing of the Company's promotional efforts with those of the gas and electric appliance societies and with the advertising of manufacturers and dealers.

News publicity dealing with the value and use of various appliances will be continued. This supplementary publicity first was systematically distributed in 1931 and the amount published by newspapers since then has fully demonstrated its value.

The advertising department will continue, also, its cooperating in the promotion of cooking schools and home economics demonstrations.

The Company's own publication "P. G. & E. Progress", published monthly, goes to approximately 500,000 customers. "Progress" conducts monthly contests intended to encourage appliance use and carries in its columns a persistent general sales appeal to all users of gas and electricity.



PACIFIC GAS AND ELECTRIC COMPANY

Owned, Operated, Managed by Californians

Here are "Salesmen" who brought home the bacon

PACIFIC COAST ELECTRICAL BUREAU
Department E-6
601 West 5th Street, Los Angeles
447 Sutter Street, San Francisco
Please send me the Bureau's free booklet on Garden Lighting. I understand there is no obligation on my part and what this booklet will show me how I can make my garden lovelier with light.
SOLD
Name John Doe.
Street 1246 Main St.
City Your City State Calif.

We have been telling you that if you put these "coupon salesmen" to work, (coupons returned by readers of the Bureau's advertising) they would "bring home the bacon." You pay them no salary —why not use them?

The companies that give them a selling job to do are repaid in additional sales and profits. Look at this:

> **One sales executive reports that out of one group of coupons sent in by prospects 30% had purchased lighting units before his salesmen could find time to make their calls. Salesmen calling on other prospects completed sales to 41% more of the same group.**
>
> **Another sales executive stated that 16% of the prospects who had mailed in coupons were sold by his salesmen.**

These "coupon salesmen" put to work for you will sell additional lighting units and lamps, increasing your profits. Surely it is worth your while to take advantage of this sales opportunity.

★ ★ ★

Pacific Coast Electrical Bureau

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